VOL. LXXXI PART ONE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

JANUARY 1956

	PAGE
The Secretary's Page	1
Notes from Wisley. By J. B. PATON	2
1954 Expedition to Nepal. Part II. By W. SYKES. *Illustrated*	6
Polyanthus Primroses. By ALLAN G. LANGDON, V.M.H. *Illustrated*	15
The Parents of the Geranium. By DEREK CLIFFORD	20
Hardy Ferns—I. *Osmunda regalis*, The Royal Fern. By GERALD PERRY. *Illustrated*	22
Plants and Problems—XXI	27
Notes on the Biology and Chemical Control of the Spruce Pineapple Gall Adelges. By V. W. FOWLER and R. GAIR. *Illustrated*	29
NOTES FROM FELLOWS:	
Despoliation of Daphne. By Dr. MAX PETTERSSON	36
Dwarf Stringless French Beans. By F. G. POTTER	37
WISLEY TRIALS, 1955:	
Dwarf Stringless French Beans	38
Delphiniums	39
Erigerons	40
Larkspurs	41
Summer-Flowering Stocks	43
Sweet Peas	45
Plants to which Awards have been made in 1955	46
Book Notes	47

VINCENT SQUARE, LONDON, S.W.1

By Appointment to the late King George VI *Charles H. Pugh Ltd, Motor Mower Manufacturers*

Please send your ATCO for servicing *now!*

Wasn't your Atco a boon in last year's glorious summer?

Atco mowing is so effortless, so easy. Not only last summer but this year too—and for many summers to come. Atco supremacy is based on service.

The unique nation-wide network of Atco service branches provides factory maintenance facilities everywhere. But please don't delay calling until the spring. Get in touch with *your* branch ***now*** —through your supplier, if you wish.

"If you've not yet got *an* **ATCO** *now's the time! See your supplier today."*

ATCO *Supremacy is based on Service*

CHARLES H. PUGH LTD, ATCO WORKS, BIRMINGHAM 9

By Appointment to Her Majesty the Queen
Seedsmen

SUTTON'S OF READING

celebrate **150** *years of service to horticulture*

Send now for your free copy of Sutton's 1956 Seed Catalogue

150TH YEAR 1806-1956 STILL SUPREME

SUTTON & SONS LIMITED
READING
Telephone: 54242 (7 lines)

MANGANESE

AN ESSENTIAL PLANT NUTRIENT

A combination of high soil pH (above 6·5) and abundant organic matter—such as may frequently be found in gardens which have been regularly limed, manured and composted—favours the locking-up of soil manganese with consequent inability of growing plants to obtain sufficient of this essential element. This is one reason why you should seek expert advice about soil conditions in *your* garden.

Information and literature may be obtained from our Agricultural Department. If your local merchant cannot supply manganese sulphate, please communicate with us.

CHEMICAL & CARBON PRODUCTS LTD.
14F NEW BURLINGTON STREET LONDON W1
Telephone REGent 1921 (five lines) Cables CHEMICARBO LONDON

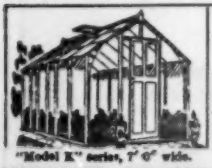
OAKWORTH

"Model D" series 8' 2" wide.

We proudly announce a new range of greenhouses all

Guaranteed

SEASONED OAK GREENHOUSES
of scientifically prefabricated construction ensure
Maximum light & tremendous strength, all models extendible. Select from over **50 different sizes.**
Free delivery, erection service if required and deferred terms



"Model K" series, 7' 0" wide.

Lean To's, various widths.

CASTOS LTD., Dept. JRH, WELLINGTON, SALOP

Send for FREE illustrated catalogue

The MERMAID RUBBER BANDS

Foremost for over thirty years, a size for every purpose. Wholesale enquiries invited. Small supplies from all Stationers.

Reg. Trade Mark

CATON, LTD.

Mermaid House, 70 St. Thomas Street, London, S.E.1
Tel. HOP 2104

MORTEGG

Is still the finest

TAR OIL WINTER WASH

1 gall. at 15/– makes 12 galls.
2 gall. 27/6 5 gall. 50/–
1 gallon makes 12 gallons wash

●

OVAMORT DNC

available at same prices

●

THIOL THIOCYANATE

1 gallon 18/6
2 gall. 36/– 5 gall. 72/6

●

The MURPHY CHEMICAL Co. Ltd.
WHEATHAMPSTEAD HERTS.

EST. 1815

By Appointment
To Her Majesty Queen Elizabeth II
Seedsmen

HIGHEST QUALITY

Toogoods Seeds

SELECTED ON THE PEDIGREE SYSTEM

ILLUSTRATED CATALOGUES
fully describing the best vegetable seeds, flower seeds, and everything for the Garden or Farm posted free to applicants.

TOOGOOD & SONS LTD.

SOUTHAMPTON, ENGLAND

By Appointment to the late King George VI. Hard Lawn Tennis Court Makers.

EN-TOUT-CAS

THE LEADING MAKERS OF HARD COURTS AND SPORTS GROUNDS IN GREAT BRITAIN

By Appointment Hard Lawn Tennis Court Makers to H.M. King Gustaf VI of Sweden

GRASS SEEDS
guaranteed

1 TRUE TO SPECIFICATION
2 GERMINATION
3 PURITY

Send for Special List giving Specifications and Percentages

THE EN-TOUT-CAS CO. LTD., SYSTON, Near LEICESTER (Syston 86163, 4, 5, 6)

LONDON OFFICE: HARRODS (4th Floor), KNIGHTSBRIDGE, S.W.1. Tel.: Sloane 8117-8

Everything for the garden . . . .

and that's literally true. All garden implements and tools, fertilisers and soils, grass, seeds, plants, shrubs, cloches, frames, greenhouses... but the list would be too long, and anyhow our catalogue is yours for the asking.

What we can tell you is that we will send you *exactly* what you want. We have supplied gardeners for more than a hundred years, so we pride ourselves on knowing the best materials, on selling them at competitive prices, and on giving everything that can be desired in the way of service.

Please write for a copy of our catalogue "Everything for the Garden" if you have not received a copy.

William Wood & Son Limited

By appointment to H.M. Queen Elizabeth II Garden Contractors and Horticultural Builders

TAPLOW, BUCKS.

Telephone: Burnham 1155 (3 lines). Telegrams: Gardening Taplow

f and s

Special 1956 tours for

GARDENERS
BOTANISTS
ALPINE FLOWER ENTHUSIASTS

A party will leave on 15th June for the Dolomites (MISURINA), to study and enjoy the alpine plants and flowers there, led by

Mr. John Gilmour, M.A., F.L.S.
Director of the University Botanic Garden, Cambridge.

Fully inclusive price for 17 days: **56 guineas.**

Plans are also being made for a further tour to St. Luc in the Swiss Valais, following on last year's very successful visit; and to the Julian Alps in Northern Yugoslavia.

FAIRWAYS & SWINFORD (TRAVEL) LTD.
10 Hanover Street, London, W.1
Telephone · Mayfair 6801/2

Let **HUMEX**
solve your heating problems!

Horticultural Watertight Pattern

TUBULAR HEATERS

2 ft.	120 watts	31/- carr.	2/-	
3 ft.	180 „	36/- „	2/-	*Rustless aluminium cast. Complete with fixing brackets. 60 watts per foot. Can be mounted singly or in banks.*
4 ft.	240 „	41/- „	2/6	
6 ft.	360 „	51/- „	2/6	
8 ft.	480 „	61/- „	3/6	
10 ft.	600 „	73/6 „	3/6	
12 ft.	720 „	84/6 „	4/-	

THERMOSTATS

Model B/1 (illustrated) for greenhouses. Capacity 5 amps. 35° – 75° F. Price 37/6, post free

Model A/2 for greenhouses, with Pilot Light. Capacity 15 amps. 35° – 75° F. Price 55/–, post free

Model P/F for birdrooms, living rooms, sheds, etc. Capacity 15 amps. 40° – 80° F. Price 40/-, post free

POST THIS COUPON NOW!

Please send FREE Brochure on Automatic Greenhouse Heating.

NAME.....

ADDRESS.....

.....

ROBERTS ELECTRICAL COMPANY LTD. (Dept. RH2)
11/13 *High Road, Byfleet, Surrey. Tel.: Byfleet* 3928

V.H.—COMPOUNDS OF
VERMICULITE
AND
MATURED BARK FIBRE

FOR SEED RAISING
AND PROPAGATION
OF CUTTINGS
BRAND 44S

SOIL CONDITIONERS
BRAND 88L—FOR LIGHT SOIL
BRAND 88H—FOR HEAVY SOIL

SEND FOR DESCRIPTIVE LITERATURE & PRICES

VERMICULITE (HORTICULTURE) CO
12 & 13 BRIDGEWAY HOUSE
LONDON W.8
WORKS: OXFORD

BENTLEY'S

CHRYSANTHEMUM, SWEET PEA, DAHLIA AND CARNATION FERTILIZERS

have a supreme and proud record of Exhibition successes.

For over 25 years most of the
Premier Awards
at the
National and Provincial Shows
have been awarded to regular users of these well-known specialities.

If your local supplier does not stock them please send direct for full particulars and prices to:

JOSEPH BENTLEY LIMITED
Horticultural Manufacturing Specialists
BARROW-ON-HUMBER, LINCS.

LOOK
A Lucky Winner? not on your life-

Photo by Leo Tuppen, Halstead

Two 1sts, five 2nds and four 3rds won for Mr. Earey the Butler Challenge Cup—thanks to BIO!

HE MADE CERTAIN— JUST AS *YOU* CAN!

Mr. J. W. Earey, winner of Halstead Horticultural Society's Butler Challenge Cup, says "*I owe much of my success to your Bio Products.*"

After only two seasons of growing and showing Dahlias, Mr. Earey has achieved great success in winning the Butler Challenge Cup in an Open Show. Yet the results *he* got from using **Bio** products can be repeated by *you*! Read what he says:

"Four years ago I tried **Bio** on peas and beans and secured *several first prizes against keen competition.* I have to admit—I was sceptical of trying it with flowers, but I used **Bio Humus** and **Bio Fluid** and most plants *have grown* 20 % *higher* than the catalogues state!

But, *instead of this being soft bush growth with little flower, the number of flowers has been doubled!*"

MAKE **CERTAIN** OF SUCCESS WITH **BIO**!

Bio Humus	from 7 lbs. 4/3	**Bio Agricolloid**	from 2/6
Bio Fluid	from 8 ozs. 2/-	**Baby Bio**	1/6 per flask

Bio *Feeds plants NATURALLY*

Compare these two rows—you can see the difference Collite makes.

"You can SEE the difference"

- - - says Mr. C. Mitchell, The Avenue, Amesbury, Wilts.

"Two rows of spinach - - - sown in August, the ground being very dry, I put *a few handfuls of Collite* along one drill. You can *see* the difference - - - The row *with Collite germinated three weeks earlier* than the other - - - also only *half, or even less,* of the seeds germinated along the row *without Collite,* as you can see by the photograph. Next season I shall use Collite with all my sowing."

COLLITE—horticultural vermiculite retains moisture, air warmth and life-giving nutrients far longer than any soil structure. It's the perfect growing medium, indoors and out.

From 2 gall. (dry measure) 4/6

COLLITE

pH Controlled HORTICULTURAL VERMICULITE

See your Horticultural Shop about BIO and COLLITE today!

Finch & Knight Ltd. (Bio Sales), Waltham Abbey, Essex.

COOK'S *"Norwich"* BRUSHES

"A turn and we stand in the heart of things"

272 Flower Pot Brushes

Seedlings, 4/–
Tom Thumb, 2¼"–3" pots, 5/–
Sixties, 3¼"–4" pots, 5/9
Forty-eights, 5"–6" pots, 6/3
Thirty-twos, 7" pots, 6/9
General Purpose Brush for amateurs, also suitable for outside washing, 3/3
Supplied Singly or Complete Set of Six Brushes, 28/6. All post paid.

Our Illustrated List of Hand-made Brushes and Tools is available to all desiring quality and craftsman goods.

COOK'S

The Oldest Brush Shop in the Country
Makers Since 1814

DAVEY PLACE, NORWICH, NORFOLK

WAKELEY'S

(Registered Trade Mark)

4 LB HOP MANURE

Stable manure is scarce, but you'll find Wakeley's Four-Fold Hop Manure a perfect substitute—Humus, Nitrogen, Phosphates and Potash—everything the soil needs from seed-time to harvest—to enrich it, and stimulate and sustain plant life and growth.

PRICES:

Small Bag 7/6, Medium Bag 11/3, Large Bag 18/6, 10 large bags 180/-, 20 Large Bags 350/-

Prices subject to alteration without notice

FROM ALL THE BEST NURSERYMEN AND SEEDSMEN

or carriage paid England and Wales (Scotland 1/6 Large Bag; 1/- Medium Bag; 9d. Small Bag extra). If any difficulty, write to address below.

Write for new season's price list. Booklet of cultural instructions also sent if required.

Our Spring List of Gladioli, Seeds, Plants, etc., is also now ready, free on application.

WAKELEY BROS. & CO. Ltd.
235 Blackfriars Road, London, S.E.1

WALTER C. SLOCOCK, Ltd.

FOR OVER 160 YEARS

RHODODENDRON SPECIALISTS

AND PRODUCERS OF FIRST-QUALITY

ORNAMENTAL TREES AND SHRUBS, FRUITS, ROSES, Etc.

Please write for copies of our

CATALOGUES

"RHODOS and AZALEAS" and/or "TREES and SHRUBS"

GOLDSWORTH NURSERY
WOKING .·. SURREY

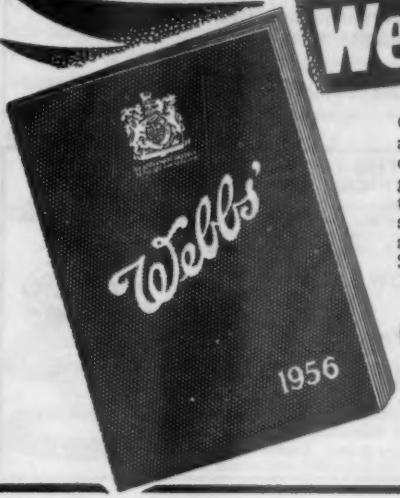
DOBBIE'S *Reliable* **SEEDS**

Send now for our FREE
SEED & PLANT CATALOGUE
CONTAINS OVER 130 ILLUSTRATIONS

DOBBIE & CO. LTD
Nurserymen & Seedsmen
EDINBURGH • 7

Good Gardens begin with...

Webbs' *Garden* Guide



Our new 1956 Garden Guide is now available. Essential to the keen gardener—Full of practical information and hints on the garden month by month; complete details of old favourites, new strains and specialities of WEBBS' Pedigree Flower and Vegetable Seeds, Lawn Seeds, Plants, Seed Potatoes, Bulbs, etc.

Webbs'

Dept. 23, WORDSLEY
STOURBRIDGE

THE

CRITTALL

"CADET" RUSTLESS GREENHOUSE

Easily erected, the "Cadet" is now available in four sizes. Made from heavy rolled steel sections electrically welded and completely rust-proofed by Hot-dip Galvanizing.
Complete with glass, putty, glazing clips and foundation lugs.
Free delivery: despatch within 14 days.

DEFERRED TERMS AVAILABLE

Type No.	Length	Width	Height to ridge	Price
1A	8' 3"	6' 3"	7' 6"	25 gns
1B	10' 3"	6' 3"	7' 6"	29 gns
2A	8' 3"	8' 3"	8' 2"	31 gns
2B	10' 3"	8' 3"	8' 2"	35 gns

Made by the Metal Window Engineers with the International reputation for high quality of workmanship and materials. Can be seen at leading London Stores and at Agents throughout the country.

Send for full details to:—

THE CRITTALL MANUFACTURING COMPANY LIMITED
Horticultural Department C, Braintree, Essex

JUSTIN BROOKE LTD.

WICKHAMBROOK, Nr. NEWMARKET, SUFFOLK

We invite you to visit our nurseries and fruiting orchards at any time, including Sundays—preferably by appointment.

We have a large acreage of nursery stock, including Peaches, Nectarines, Apricots, Cherries, Apples, Pears, Plums and Figs.

In our fruiting orchards you can see the results obtained by planting similar stocks of all these fruits; and you can see the results at various stages of growth.

PEACHES ON PEACH STOCK

Telephones:

In office hours—Wickhambrook **200** Out of office hours—Wickhambrook **304**

ELPREQ HORTICULTURAL APPLIANCES
Dept. 35, 123 Terminus Road, Eastbourne, Sussex

THE ELPREQ INSTANTUS ELECTRICAL GREENHOUSE HEATER

Made from heavy-gauge sheet steel (galvanised) the heater is 4 ft. long and rated at 1 kw. Suitable for any size house. Up to three heaters can be controlled by 1 thermostat.

Price: £2 10s. 0d., or with thermostat £4 5s. 0d. Carriage 5/–.

SAFE (LOW VOLTAGE) **SOIL WARMING**

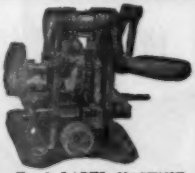
ONLY 47/6

Postage 2/6

- TRANSFORMER
- TWO HEATING WIRES
- SUFFICIENT FOR 50 sq. ft.

Send 6d. for Horticultural List. 6d. refunded with the first order. Credit terms available

'SERPENT'
INDELIBLE (LEAD)
LABELS
LAST 100 YEARS
NEAT, LEGIBLE SELF-AFFIXING, ADAPTABLE, COMPLETELY RELIABLE



No. 1 LABEL MACHINE

Printed with *any* (different) names, 4/3 dozen; 34/- 100. Label-printing Machines from £3 19s. 6d. Send for lists and FREE SAMPLE (*any* name). Complete Label-machine Outfits, from £5 5s. 0d., postage 3/-, make IDEAL GIFTS.

SERPENT LABEL WORKS
ROCKBEER, EXETER

THE
SOUTHERN TREE SURGERY COMPANY

Arborists and Tree Surgeons

Byways, Woodham Lock, West Byfleet, Surrey (Byfleet 2738)

79 Tower Street, Winchester, Hants (Tel. 3872)

Advise on, estimate for, and carry out all tree work

CHRYSANTHEMUMS

Plants and Cuttings supplied to Trade, Retail and for Re-Sale
Earlies, Mids, Lates, and Garden Pompons a Speciality
No order too large or too small

IMPORTANT: When applying for Catalogue Please state Trade or Retail

All communications to:

ELM HOUSE NURSERIES

WALPOLE ST. PETER • WISBECH • CAMBS.

SHRUBS

give better value over a longer period than any other type of planting. Year after year a well-balanced shrub border provides beauty of form and colour through all the seasons. Our large stock includes ornamental trees and shrubs of every type worth growing. They are described in our 64-page catalogue, which also contains a large number of special collections of plants chosen for different soils and varying conditions.

SEND FOR A FREE COPY TODAY

Stewarts NURSERIES

FERNDOWN
•
DORSET

SAVE money by raising your own bedding plants this Spring for an even better show in the garden this year. Also grow a good crop of Tomatoes in the Summer, whatever the weather.

A well-constructed GREENHOUSE should have a place in every Garden, and our wide range of "All-Cedar" Greenhouses, which do not require painting, are neat in appearance and blend in with any garden layout, as well as fulfilling every requirement of the Greenhouse enthusiast.

Illustrating an 18 ft. by 8 ft. "Extendible-Unit" Greenhouse.

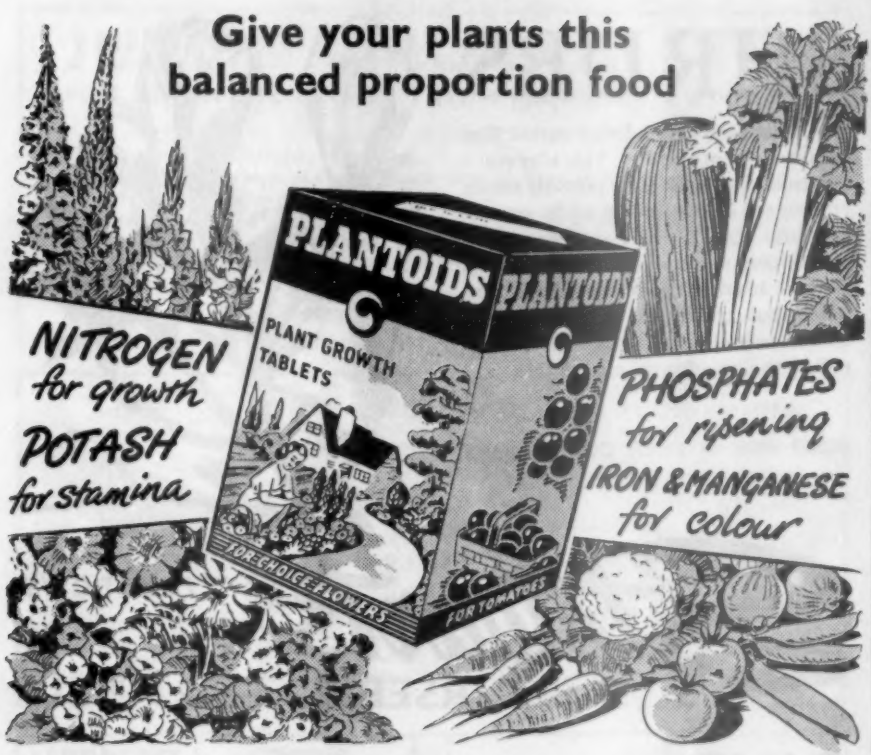
Write today for our new fully illustrated catalogue.

C. H. WHITEHOUSE LTD.

Phone: FRANT 247

Buckhurst Works, FRANT, Sussex

Give your plants this balanced proportion food



The PLANTOIDS formula embodies, in correct proportions, all that plants need to feed and sustain them, promote quick, healthy growth, and give excellent yields of "show" quality vegetables, flowers and soft fruits. Handy in use, PLANTOIDS help to take the hazard out of gardening and ensure its success.

Get to the root of things with

PLANTOIDS

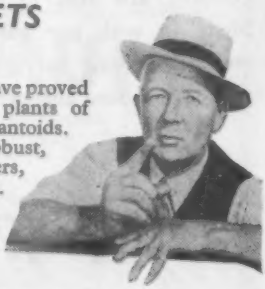
REGD.

PLANT GROWTH TABLETS

1 *Make a hole near the plant.* 2 *Drop in a Plantoid.* 3 *Nature does the rest.*

Fred Streeter says:—

"We regular growers have proved again and again how plants of all kinds thrive on Plantoids. They encourage the robust, healthy growth of flowers, vegetables and soft fruits.



Obtainable from Seedsmen, Ironmongers, Multiple Stores, Co-ops etc.

HALF PACK 2/-; STANDARD PACK 3/6; GROWERS PACK 8/-

Distributed by GRAHAM FARISH LTD. BROMLEY, KENT

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXI PART ONE

January 1956

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JANUARY AND FEBRUARY

Shows

TUESDAY, January 24 12 NOON to 6 P.M. WEDNESDAY, January 25 10 A.M. to 5 P.M.	Fortnightly Flower Show.
TUESDAY, February 14 12 NOON to 6 P.M. WEDNESDAY, February 15 10 A.M. to 5 P.M.	Fortnightly Flower Show.
TUESDAY, February 28 12 NOON to 6 P.M. WEDNESDAY, February 29 10 A.M. to 5 P.M.	Fortnightly Flower Show. Annual General Meeting at 3 P.M. on February 28. (See below.)

Lectures

TUESDAY, January 24, at 3 P.M. "Medicinal Plants," by MR. R. G. ATKINSON, F.P.S., F.L.S.

TUESDAY, February 14, at 3 P.M. "Plant Collecting in the Australian Desert," by MR. F. L. HILL, B.SC., A.M.I.E.E.

Demonstration at Wisley—There will be a demonstration at Wisley on Wednesday, February 29, on the Pruning of Roses. The demonstration will commence at 2 P.M., and will be repeated at the same time on Thursday, March 1.

Annual General Meeting—The Annual General Meeting to receive the Report of the Council for 1955 and a statement of accounts for that year will be held on Tuesday, February 28, at 3 P.M. The Meeting will be held in the Old Hall, as in 1955, so there will be ample

room for all who wish to attend. It is hoped that as many Fellows as possible will come.

The Society's Examinations in 1956—Candidates who wish to enter for the Society's examinations in horticulture in 1956 are reminded that the closing dates for entry forms are as follows: General Examination in Horticulture, and General Examination in Horticulture for Juniors—Monday, January 9, 1956. National Diploma in Horticulture—Intermediate and Final Examinations, and N.D.H. Honours—Wednesday, February 1, 1956. Teachers' Diploma in School Gardening—Intermediate and Final Examinations—Wednesday, February 1, 1956.

Admission to the Gardens at Wisley—The Council has decided as an experiment to open the Gardens to Fellows on Sundays throughout the whole year. During 1956 the times of opening on Sundays will be as follows:

> From the first Sunday in January to the first Sunday in March, and from the first Sunday in October to the end of the year, from 2 P.M. until 5 P.M. or sunset, whichever is the earlier; from the second Sunday in March to the last Sunday in September, from 2 P.M to 6 P.M.

NOTES FROM WISLEY

J. B. Paton

THE visitor to the Gardens in January will not find so many plants of interest in the open air, but under the protection of glass he may see quite a good collection of plants considering the limitations of space imposed by the size of the glasshouses. The Stove House contains quite a wide range of flowering and foliage plants and so we may conveniently consider some of the specimens to be seen there.

One of the most useful and the most ornamental of the foliage plants is *Codiaeum*. This genus is often confused with *Croton* from which it differs in that it has glabrous leaves, milky sap and erect stamens. The leaves which are brightly coloured in varying shades of yellow, bronze, red and green may be either entire, cut or lobed and in order to bring out the full colouring it is necessary to give the plants plenty of light. Of the various forms note may be made of 'Fred Sander' which has a green lobed leaf with a central vein and a basal blotch of yellow; 'Eugene Drapps' which has a narrow elliptic green yellow-veined leaf; 'Flamingo' a narrow linear leaf which is dark green with central vein and narrow edge of crimson and stem of reddish-bronze; 'Flora Russell' with a narrow willow-like leaf pale green veined with yellow; and 'Lady Zetland' which has long pointed leaves of medium green veined with yellow.

The genus *Codiaeum* is a native of Malaya and the Pacific Islands and is a member of the family Euphorbiaceae. Another member of this

family is *Acalypha* of which there is growing at Wisley *A. wilkesiana macrophylla*, a very handsome foliage plant with cordate-ovate leaves of russet brown colour blotched with pale spots. There is also *A. hispida* from New Guinea in the East Indies which is grown mainly on account of its bright red flowers carried in long drooping tassel-like spikes. Also from the East Indies is *Sansevieria zeylanica* which has falcate, deeply channelled, dull green, white-marked leaves, and there are also to be seen *S. trifasciata* with deep green leaves banded with whitish-green, and the popular *S. trifasciata laurentii* with similar markings but with the margin longitudinally striped with golden-yellow. These last two are denizens of Western Tropical Africa and the genus is placed in the Liliaceae as is *Dracaena*. From the Congo we have *D. godseffiana* with obovate green leaves with numerous light cream spots. It was introduced to cultivation in 1892 when Kew received plants sent by MR. HENRY MILLEN, Curator of the Botanical Station at Lagos. Also from Africa *D. deremensis* has sharply pointed leaves with a white central band tapering to a point at the tip of the leaf and leaving on either side a deep green margin about ¼ inch wide. There is also *D. deremensis* 'Bausei' which is a sport from *D. deremensis* 'Warnecki' and which makes a compact plant with handsome dark green, white-banded leaves. Not to be confused with *Dracaena* is its close ally *Cordyline* which differs from *Dracaena* by having a creeping rootstock, by having three large bracts at the base of the inflorescence and by having six to fifteen ovules in the cells of the ovary. The Asian *C. terminalis* is one of the most commonly grown species and has green leaves and there are also many other forms with variously coloured leaves. *Cordyline* was much valued by the Maoris for its edible roots.

From Polynesia comes *Polyscias guilfoylei victoriae*, a representative of Araliaceae, which makes a compact plant on which are carried serrated leaves. These leaves are coloured green, are margined with white and are splashed with grey giving a delicate appearance. Also represented is *Polyscias balfouriana* with a heart-shaped, toothed leaf of green, spotted and margined with white. This plant comes from New Caledonia which lies to the north of New Zealand.

From China and Japan *Ficus pumila* is a handsome plant for both greenhouse and living-room as is its form *variegata* with green leaves margined with creamy white. At Wisley the variegated form falls over the edge of the staging. Other plants to be seen in this position are the ornamental grass *Oplismenus hirtellus variegatus* with leaf blades striped white and pink and the Malabar plant *Cyanotis kewensis* which is related closely to the more popular *Zebrina pendula* of Mexico. *Episcia cupreata*, a native of Colombia, is also of creeping habit and has elliptic leaves banded with red and silver down the middle. There is also the Nicaraguan *E. chontalensis* with ovate light green leaves, purple beneath. These are two Gesneriads, as is the Peruvian *Nautilocalyx bullatus*, also known as *Episcia tessellata*, which has leaves of dark olive-green above and wine-red beneath.

Other foliage plants from the New World are *Hoffmannia ghiesbreghtii*, of which may be seen the variegated form in which the leaves are blotched with yellow, creamy-white and red, the Central American *Rhoeo discolor* which has striking deep purple leaves, and from Peru with purple-tinged leaves, *Tradescantia reginae*. Two Bromeliads which attract attention on account of the rosettes of leaves which form an urn-shaped vase in the centre are *Aechmea mariae-reginae* coming from Costa Rica and with broad lanceolate leaves, and *Aechmea fasciata* from Rio de Janeiro with broad recurved leaves banded with white. The specific name *mariae-reginae* is given to this plant because in Costa Rica it flowers at the time of the Feast of Corpus Christi, when it is used for decorating the altar and so is known locally as the "Flor de Santa Maria."

From Peru comes *Fittonia argyroneura* which has bright green leaves beautifully netted with white veins. Very similar is *Fittonia gigantea* but with red veining. Both these plants are very accommodating as they may be grown under other plants or even under the staging, provided that they receive sufficient water.

From Brazil *Bertolonia maculata* has cordate green leaves, veined purple above and purple beneath. The whole surface of the leaf is rich and glossy and so causes the light to be reflected to give a coppery velvety hue to the plant. No doubt one of the finest foliage plants in the house is the Colombian *Anthurium crystallinum* with ovate-cordate leaves up to 14 inches long which are coloured bright velvety green, veined with white and pale rose beneath. Each leaf is carried in a vertical position by a 6-inch-long stalk. Other species of *Anthurium* which may be noted are *andreanum* with red spathe and spadix and *scherzerianum* with brilliant scarlet spathe and orange-red, spirally twisted spadix. Both these plants are in flower over a long period throughout the winter.

Other flowering plants of interest during the shorter days of winter include *Agapetes*, *Begonia*, and *Euphorbia*. *Agapetes macrantha*, trained up under the glass on the east side of the house, has a profusion of waxen, lantern-like flowers which appear from the stem in late November and continue to hang on the branches until late January. The flowers are red banded with white. At Christmas time the begonias of the 'Gloire de Lorraine' type are much in demand and so there are always a few plants of this very free-flowering plant to be seen in December and January. The original plant was raised by Messrs. Lemoine & Son, of Nancy, by crossing the South African *Begonia dregei* with *B. socotrana* from the Island of Socotra off the east coast of Africa. There are now many varietal forms available and at Wisley we may note 'White Silence'; 'Fairy'—pale pink; 'Rothschild'—deep pink; and 'Mrs. J. Petersen'—rosy red with bronze foliage. The poinsettia *Euphorbia pulcherrima* with yellow flowers and vermilion bracts is very striking, while *E. fulgens* is more graceful with small clusters of flowers bearing conspicuous orange-scarlet bracts all carried on arching stems. In late January the very sweetly scented *Mitriostigma axillare* should not be passed by without notice.

PLANTS OF INTEREST AT WISLEY DURING JANUARY

LABORATORY WALLS

Chimonanthus praecox luteus
Iris unguicularis
Viburnum foetens

GLASSHOUSES

Acacia species
Beloperone guttata
Camellia japonica varieties
Cestrum purpureum
Chorizema ilicifolium
Cypripedium varieties
Dendrobium species
Epidendrum species
Erica canaliculata
„ *veitchii*
Hakea acicularis
Hibbertia volubilis
Jacobinia pauciflora
Jasminum polyanthum
Odontoglossum crispum
Plumbago rosea
Reinwardtia trigyna
Rhododendron ciliicalyx
Zantedeschia aethiopica

SEVEN ACRES

Cornus sanguinea
„ *stolonifera*
Erica species and varieties
Hamamelis species
Lonicera fragrantissima

SEVEN ACRES—*continued*

Salix alba chermesina
„ „ *tristis*

WILD GARDEN

Daphne mezereum
Garrya elliptica
Hamamelis mollis
Helleborus niger
„ *orientalis*

ROCK GARDEN AND ALPINE HOUSE

Coronilla glauca
Crocus susianus
„ *tomasinianus*
Galanthus species and varieties
Iberis semperflorens
Odontospermum maritimum
Polygala chamaebuxus
Primula megaseaefolia
Ranunculus calandrinioides
Saxifraga varieties
Scilla tubergeniana

BATTLESTON HILL

Erica species and varieties
Hamamelis species
Mahonia bealei
„ *japonica*
„ *lomariifolia*
Prunus subhirtella autumnalis
Rhododendron 'Jacksonii'
„ *mucronulatum*

1954 EXPEDITION TO NEPAL

W. Sykes

PART II

WILLIAMS and STAINTON had meanwhile encountered quite distinctive floras in their own areas. WILLIAMS found that although there was an exceptionally heavy monsoon rainfall on the south side of the Annapurna range there was a limited number of species in the alpine zone due in part to the rapid drainage of water from the steep slopes. The area did prove to be singularly rich in primulas and meconopsis, however, and many species occurring there were not found south of the Dhaulagiri range. This seems to show that the great valley of the Kali river acts as a barrier to a certain extent between the eastern and western elements of the Himalayan flora.

A bright red *Meconopsis* which appears to be a form of *Meconopsis regia* is considered by WILLIAMS to be one of his greatest finds (Fig. 1). This form was growing on an isolated ridge at 14,000 feet with the normal yellow-flowered *M. regia* in the vicinity, and he observed plants with flowers of an apricot colour which apparently have arisen as a result of hybridization. Another *Meconopsis* species had pink flowers, much paler hairs, and larger oval basal leaves than *M. regia*. This plant, which was more compact and had a larger number of branches than the above-mentioned species, is as yet unnamed. *M. lyrata* had milky-blue flowers and grew on open slopes, and in similar situations was *M. sinuata* with curiously brown-blotched sinuate leaves and bluish flowers. *Primula wigramiana* with nodding pure white flowers is a charming species of the soldanelloid section, and occurred on open south-facing slopes around 14,000 feet. In gullies at the same altitude drifts of *P. stuartii* with pendulous orange-yellow flowers were another attraction not seen west of the Kali Gandaki. Certain species such as *P. sikkimensis* were conspicuous by their absence and lower down there was almost no *Pinus chylla* or *P. roxburghii*. New westward extensions of the previously known ranges of the epiphytic *Rhododendron dalhousiae* and the tree fern *Cyathula spinulosa* were made. The latter plant was common in the wet shady ravines between 3,000 and 5,000 feet and attained heights of at least 20 feet among the lush vegetation.

The drainage system of the Kali Gandaki from the Annapurna and Dhaulagiri ranges northward to the Tibetan border was a much drier area. High, rolling, brown pastures with poor stony soil, and the barren valley bottom of the Kali in the centre, produced a flora which, like the people, resembled that of Tibet. During the monsoon, although the sky was usually overcast and wet mists were frequent, the rainfall was not heavy because of the barrier created by the high mountains to the south. In this type of country STAINTON found many beautiful plants.

Stellera chamaejasme preferred a dry stony slope where it could send its long tap-root downwards (Fig. 12). The pale pink flowers with deeper coloured buds were greatly enhanced by the delightful fragrance which is usually present in members of the Thymelaeaceae (Daphne family). Where the ground became very gravelly, by no means unattractive was *Arisaema flavum*, a little aroid with a yellow spathe. *Primula tibetica* was often abundant in bogs, and in this area was found a form of *Primula macrophylla* with a whorled inflorescence approaching that of *P. sinoplantaginea*. The beautiful *Androsace globifera* with silvery cushions of foliage and bright pink flowers was frequently seen in very exposed country. STAINTON found several dwarf shrubs, which if they can be cultivated, should prove an asset in the garden. He was able to obtain a large quantity of seed of the recently discovered *Rhododendron lowndesii*. This low creeping species grew under the shade of boulders at 12,000 feet and produced its pale yellow flowers rather late in the season. *Sophora moorcroftiana* is a spiny shrub with silky pale green foliage and flowers of clear pale blue, and in similar situations on the bare stony slopes beside the Kali was *Lonicera hypoleuca* with fragrant yellow flowers. More than one new *Berberis* was discovered on the expedition, but the most distinct was *Berberis mucrifolia*. It often grew at altitudes of 14,000 feet or more and formed a compact bush under 2 feet high, possessing narrow deciduous foliage and STAINTON was able to collect some of the orange-red fruits. Most of these plants from the drier region come from quite high altitudes and should be quite hardy in cultivation, apart from the desirability of protecting them from excessive winter rains, which often prove so disastrous to alpines in this country.

During the early part of August I revisited some of the region in which I had previously collected. The grassy slopes now presented an entirely different display and streamlets were everywhere flowing down to link up with the larger rivers. It is probably this type of country, just above the tree limits, which can provide the ordinary British garden with the most amenable plants. The rosy-pink *Geranium collinum* is not widely grown, but this dissected leaved species is very common in the Himalaya, and is certainly worthy of a place near the front of the herbaceous border, where it will not get baked in the summer or water-logged in the winter (Fig. 13). *Morina longifolia* with its stiff erect stems and pink flowers in whorls also commonly grew near the upper forest limits.

The genus *Cremanthodium* has never been easy to grow in cultivation and indeed when I saw some of the species upon tiny rock ledges and steep stony screes above 15,000 feet I was not surprised. However, the genus has a very wide range, and other species grew in bogs at 9,500 feet and on the open grasslands above. *C. arnicoides* really does not have the appearance of a member of the genus, for instead of the usual single nodding head of yellow composite flowers it has a tall spike 2½ feet high bearing a number of nodding inflorescences. This species with its large cabbage-like leaves grew beside my tent at one grazing site and formed a large drift of yellow. Seed and live roots were later

obtained because it should prove possible to grow it outside in Britain, especially in the west. Any account of plant-hunting activities in the Himalaya would be incomplete I feel without mention of the *Pedicularis* species. These beautiful plants grew in every type of environment in the temperate and alpine zone, but the more attractive species were to be found in the alpine meadows between 11,000 feet and 14,000 feet. *P. sculleyana* has a large spike of creamy flowers with a purple tip to the "beak," and grew beside streamlets. *P. megalantha* has flowers of deep magenta-purple and again grows to nearly 18 inches. Other species with pink and white flowers such as *P. siphonantha* are nearly prostrate and can also be found on some of the very high screes. The immediate question that came to my mind was the necessity of a host for these plants since they are usually considered to be semi-parasitic in behaviour. I did find, however, that most species seemed to have quite well developed root systems of their own, and, indeed, those which grew in the higher more barren regions did not always appear to be growing in close proximity to a possible host. An interesting observation was the fact that in areas of burnt rhododendron scrub the presence of *Pedicularis* was much more marked. Another factor concerning their culture is the probable necessity for obtaining seed in order to propagate them for many species seem to be monocarpic.

Towards the latter part of the monsoon the various *Codonopsis* species were flowering at their best. The first species which I observed flowering was *C. rotundifolia*, a not very showy plant with pendent purplish corollas. This was in early July, and it grew among dwarf *Spiraea bella* and tall herbaceous plants at 11,000 feet. The thin twining stems had completely withered away by the end of the monsoon, and I failed to obtain any of the tubers which I knew must be present in the ground. I think that the collecting of living material (apart from seed) of *Codonopsis* generally provides more difficulties than most other plants. The thin slender stems usually penetrate for a considerable distance below the surface of the ground, and when the plants are growing in scrub-covered country, the roots or tubers are not easy to trace. *C. convolvulacea* is not a new plant by any means but living material was obtained, because one does not commonly see it in gardens. Unlike many members of the genus it does not possess an unpleasant scent, and its deep blue flowers, with the corolla lobes spread wide open, strongly recall the allied *C. vincaeflora*. *C. convolvulacea* has a very large vertical range and around the upper limits I saw it flowering in mid August at 13,000 feet, scrambling among *Rosa sericea*. Later it was also observed in terraces at 8,000 feet, where it was blooming upon the dead maize stems in early October. *Codonopsis ovata* did not seem at all common south of Dhaulagiri, and I can only recall finding it in one grassy valley at just under 14,000 feet. Here its beautiful pale blue nodding flowers, unfortunately emitting a very unpleasant scent, could be seen among the long grass on the steep well-drained open slope, just above the rocky river bed. *C. dicentrifolia*, in my

opinion the finest species, occurred in a very limited area on a ridge to the north-east of the grazing site of Dhorpatan, between 10,000 feet and 11,500 feet. There upon very steep cliffs, usually facing south and exposed to the full brunt of the monsoon, grew this non-trailing codonopsis with its thick fleshy roots wedged into crevices in the rocks. For success to be achieved in cultivation, this would seem to indicate extremely good drainage requirements and yet plenty of water in the growing season. The plants were quite compact and the numerous large deep blue scentless corollas were chequered white within. In one place *C. dicentrifolia* was almost abundant and the patches of blue upon the cliff face could be observed from some distance away.

Towards the end of the monsoon it was noticeable that the dominant colour of the plants flowering in the alpine grasslands was blue or purple. *Cyananthus lobatus* is an extremely common plant in the Himalaya and in certain areas literally covered the ground in a purple sheet. The smaller *C. microphyllus* was almost equally abundant, but favoured the rather steeper slopes and cliff faces, where it preferred to grow in short turf. The colour was usually rather pale blue and in the case of both species albino forms were encountered. *Dracocephalum speciosum*, a labiate with a relatively large head of purple flowers, was inclined to be rather coarse in some of its lower localities where it attained heights of 18 inches or so. A higher form in one area seldom reached 6 inches and here when it occurred in drifts mingled with a short white umbellifer, made a very pleasant combination. In this region also I well remember the dwarf purple *Aconitum hookeri* dotted abundantly around on the gentle undulating grassy slopes. It was delightful country composed of a series of three glacial valleys, each with a clear lake in the bottom, and an overspill stream which poured down into the gorges on one side of the valleys all through the monsoon. The grey crags and boulder-strewn slopes above echoed with the cries of the red-billed choughs which like the beautiful "Monal" pheasants could often be heard calling through the swirling mist. It was by no means uncommon to catch sight of a herd of long-necked mountain goats, and if close enough, to glimpse their soft pale grey backs and white fronts and necks.

On the last day of August the expedition met again in the little town of Beni at the junction of the Kali Gandaki and Mayangdi rivers. The monsoon seemed to have almost ceased here and we all enjoyed several days of hot sun, making preparations for the remaining trip, which would last until early November. This was the period when the seeds and living plants were collected and each gathering of living material was correlated if possible with a herbarium specimen obtained at the same time. This avoids making two differing sets of numbers, since the former material only receives a herbarium number. I also purchased two large open bamboo baskets before returning to the collecting grounds. These were utilized for packing the bundles of live roots, tubers and bulbs in. Each gathering was wrapped in damp moss and if

possible was collected with a certain amount of soil adhering to the roots. In some cases small pieces of turf containing the desired plants were wrapped up, and although one does get unwanted plants growing as a consequence, the little communities resulting in some of the pans at Wisley have been very interesting. Certain plants with small "crowns" and rootstocks were additionally wrapped in polythene material. Great care had to be taken to ensure that the plants were not too wet, because when being transported all day in the hot sun on the back of a porter rotting can easily ensue. Large muslin bags draped over the baskets minimized this danger, but of course the ordinary moss-wrapped bundles needed watering sometimes.

When I arrived back in the alpine regions above Gurjakhani in the middle of September it was disappointing to find that the monsoon rains had not yet finished, and again I was not able to get a good close-up view of the massive wall of ice which forms the southern flank of the main Dhaulagiri range. More important, however, was the fact that roots and seeds had to be collected in very wet conditions. The lateness of the monsoon also meant that foliage was not dying down so quickly. However, in spite of this, we were all able to obtain most of the desirable plants that had been previously noted in flower, and they later arrived in this country in good condition. Every available receptacle had to be used for drying berries, pods, capsules, etc., especially until the abrupt ending of the rains on October 5. The servants and local porters all took part in seed-cleaning operations with obvious enthusiasm, and on more than one occasion I was greeted with several bags of carefully cleaned seed upon arrival in camp, after a day's collecting.

With the ending of the monsoon the whole alpine region undergoes a sudden change because sharp frosts quickly brown and blacken all the lush vegetation. Only a few gentians and swertias withstand these changed weather conditions and it remains a source of wonder to me how their seemingly delicate blooms can withstand the rigorous post-monsoon conditions. One member from each genus is especially worthy of mention. *Gentiana depressa* is unquestionably a very fine plant and the rich blue corolla lobes (which I have never seen in cultivated plants) were a very fine sight when seen in large numbers. The large clumps often grew on steep exposed grass slopes, and the flowers were subjected to hot sun most of the day and low temperatures at night. Of course their beauty was enhanced by the then lack of other flowers around. In early October I climbed up to the Jangla Bhanjyang Pass at about 15,600 feet, then lightly covered with the first snow of winter, and looked down to the steep country over to the north-west, which I had visited in 1952. It had been a long climb and I must have been feeling rather tired, because it was not until on my way back that I saw on a stony bank at 15,000 feet, a pale mauve form of *G. depressa*, well above the usual station for the species. It was late in the afternoon on that same day, as I was descending down towards my camp in the birch and rhododendron forest, that I first found the very attractive *Swertia*

racemosa. Large drifts of mauve, firstly in the sheltered gullies and, then, lower still, completely in the open, were composed solely of this species. The flattish vertically displayed flowers were in loose panicles up to 10 inches high. Seed was procured later, for these later flowering species often ripen seed very rapidly, but it is a pity that this species does not appear to be perennial.

Shrubs have been rather neglected in this account, mainly because most of them are well known from other parts of the Himalaya, the higher one goes the more prevalent localized species become. Several *Berberis* species, however, were attractive in fruit, especially *B. jaeschkeana* var. *usteriana*, which had quite large red berries freely produced upon compact bushes about 5 feet high. In one gorge only I found the recently discovered species *Rhododendron cowanianum*, which appears to be confined to an area of central Nepal. The straggling shrubs are deciduous and I thought that the deep yellow and orange leaves in October were a decidedly more attractive feature than the small purplish-magenta flowers. *Cotoneaster*, *Viburnum*, *Vitis*, dwarf *Salix*, and at lower altitudes a *Rhus*, also added to the autumn display.

The march back to Pokhara at the end of October was very pleasant in the then cooler subtropical valleys. The area still possessed its monsoon look of greenness, but of course every day was fine and warm. The rice and millet was being harvested, and tangerines and other fruits were fast ripening. All the herds of cattle and buffaloes had come down from the alpine grazings and were looking very sleek and fat. This was also the season of Hindu festivals and holidays, so I was often invited to partake of hot tea and various delicacies cooked in "ghi." Streamers composed of grass ropes strung with flower-heads of marigolds, poinsettias and other semi-wild plants were slung from house to house and one notable example bridged the wide Mayangdi river. The cows and buffaloes even came in for their share of garlands for one festival.

A number of plants sometimes seen in our greenhouses were flowering in the main river valleys. Some of them, such as the orange and yellow *Tagetes*, magenta *Mirabilis jalapa* the "Marvel of Peru" and *Asclepias curassavica* are not truly native to Nepal, being in fact American in origin. The beautiful scented pink shrub *Luculia gratissima* is a native of the Himalaya, however, and it would appear that it does not extend farther west than central Nepal. Vivid red *Erythrina arborescens* was visible from afar, while in some of the ravines, yellow *Lindenbergia*, violet *Torenia*, *Begonia* and *Hedychium* were flowering. Near Pokhara the porcelain blue fruits of a small shrub named *Dichroa febrifuga* were often encountered and upon steep earth banks and mossy tree trunks the orchid *Pleione praecox* was in full flower.

At Pokhara preparations for the transport of all the collected material, both botanical and zoological, were completed as quickly as possible in order to get it to England without unnecessary delay. From the ridges south of the town superb views of the Himalaya were possible during November, beautiful lakes lay in the valley, and with the delightful

climatic conditions prevailing at that time, it was with considerable regret that I boarded the little plane for Katmandu on November 8.

From Katmandu we flew south to the Indian border, with 309 collectings of living plants, now packed in seven large tea-chests. From India they were despatched by air to England, where they reached Wisley on November 22. There they were unpacked and either immediately potted up and placed in a cool house, or as in the case of many primulas, gentians, cremanthodiums, etc., were sent to the Royal Botanic Gardens at Edinburgh, where they could have the benefit of the more congenial Scottish climate. As we expected, a number of species had made some growth by the time they reached England, and it was considered advisable to keep these growing without a check, in spite of the unsatisfactory time of year for plant growth. Most of the plants arrived in good condition, and by the spring very few had failed to make any growth at all.

The first plants to show signs of flowering were the primulas. This was to be expected, since many of them are among the earliest alpines to flower in Nepal, the flowers being initiated the previous year. By the end of February, *Primula macrophylla*, *P. macrophylla* var. *moorcroftiana*, *P. edgeworthii*, *P. denticulata* forma and *P. aureata* had flowered or were in flower. Incidentally, DR. FLETCHER informs me that it was the first time that living plants of *P. aureata* have been introduced into cultivation. It was only found on the expedition by WILLIAMS, on the wet slopes south of the Annapurna range. Later the soldanelloid section came into its own, with *P. wigramiana*, *P. reidii* var. *williamsii* and *P. buryana* with its blue variety.

At Wisley many other genera had commenced to grow by the early spring. *Cypripedium cordigerum* very quickly began to show its pleated green leaves and several of the late-flowering delphiniums, aconitums and *Dracocephalum speciosum* were growing. The little yellow saxifragas such as *Saxifraga brunoniana*, *Androsace lehmanii* and *Morina nepalensis* were also soon growing well and in some cases flowering. It was only natural that the woody subjects should be later to show signs of life, but although I nearly despaired of some of them, practically all except *Daphne bholua* and *Tsuga dumosa* eventually commenced growth. A fine form of *Rosa sericea* grew away very rapidly, as did *Desmodium tiliaefolium* and *Lonicera hypoleuca*. By the time summer had arrived, such beautiful plants as a large-flowered *Incarvillea*, *Notholirion macrophyllum*, *Delphinium grandiflorum*, *Aconitum hookeri*, *Iris kumaonensis*, and *Potentilla coriandrifolia* had flowered.

During the hot dry weather which we experienced in July this year, a number of fine plants flowered, in spite of conditions so unlike the soaking monsoon rains to which they were accustomed. *Lilium nepalense*, which I hope may prove hardy from our collectings, *Codonopsis ovata* and *C. dicentrifolia*, were among those which provided a display in the Alpine House. Many visitors must have admired the dainty spiral spikes of the rose-coloured little *Spiranthes sinensis*, and as I write

another alpine terrestrial orchid, *Satyrium nepalense* has produced a spike of pink, sweet-scented flowers. Two plants collected by STAINTON in the gorge of the Kali Gandaki near Tukucha, at about 8,500 feet, were very attractive in one of the glasshouses. They were *Amphicome diffusa*, a member of the Bignoniaceae, with pink tubular corollas, and the liliaceous *Theropogon pallidus*, with long lanceolate dark green leaves and numerous pendulous little whitish bells. Most of the living plants brought back, with the exception of a case of epiphytic orchids, will, I hope, prove to be quite hardy and some have been planted outside in order to establish them under normal English garden conditions.

The seed we collected was distributed to a number of people in all parts of Great Britain, a round figure of 18,000 seed packets being sent out for distribution. At Wisley most of the seed was sown in late February, with the exception of some shrubs which require a period of cold conditions before their dormancy can be broken. I was pleasantly surprised to hear from many sources beside Wisley of the very good germination which resulted, and it seems as if my fears as to the quality generally, because of the long monsoon, were groundless. Most of the primulas and meconopsis germinated exceptionally well, and gave rise to problems over lack of space in the glasshouse department at Wisley in the spring. Seedlings of the supposed red form of *Meconopsis regia* were among the most vigorous of the meconopsis. Fine seedling pans of many of the alpine meadow plants resulted. Among them were *Geranium collinum*, *Geum elatum*, *Lloydia longiscapa*, *Aconitum* species, *Delphinium* species, *Cyananthus* species, *Codonopsis convolvulacea* and *C. dicentrifolia*, *Polygonum emodi* and others. Many of these are now growing outside in various borders at Wisley. Pedicularis, which I mentioned earlier as probably requiring a host, were sown in pans with a little grass at one side, and I noticed that most species germinated very freely. In the spring the bulk of the shrubs were sown in cold frames and most of them germinated quite quickly. These included several conifers, but again the elusive *Tsuga dumosa* has not grown. However, we do not write off seed as having failed to grow until at least two years have elapsed, since one is often surprised by odd pans of seed germinating after several years. Relatively few seedlings have flowered this year, the great majority being perennial and they will probably need at least two years before they can produce a worth-while display. A few plants such as *Potentilla eriocarpa* (a mat-forming plant of vertical rock faces), *Nepeta spicata* and *Chamaenerion* (syn. *Epilobium*) *latifolium* have bloomed in the seed boxes in which they were pricked out.

The full value of the contribution which the expedition has made to horticulture will, of course, not be able to be judged completely for several years. The rows of seedlings in the nursery beds will have to be carefully tended and observed when in flower. The first year or two often proves the most difficult, until the cultivation requirements are understood and the plants become acclimatized. Living plants transported from their natural habitat can prove very disappointing especially

during the first year or two. The flower size and colour may be lacking, or growth may be weak and straggly. This I feel is often due to the fact that the plants are not yet adapted properly, and sometimes it would probably be beneficial to remove at least some flower-buds. One of the biggest difficulties is to keep many of the dwarf alpines down to their natural size, for too many lose part of their beauty when they grow too rank and tall. The barrenness of the high screes and rock ledges in the Himalaya would seem to indicate starvation treatment, when the plants are established.

It will be apparent to many that I have mentioned at least several familiar names in the last few paragraphs and it may cause surprise that these plants were brought back. There are two main reasons for this. Firstly, it is to be expected that individual species populations, with a range through such a large area as the Himalaya, will vary to a greater or lesser extent in different parts of their range. This, of course, is often the case even in a small country such as England. Secondly, a number of species are always what I choose to term as "only just in cultivation." In other words, only a few specialized gardens can grow them, and, therefore, there is a risk that they may become lost to cultivation. By endeavouring to introduce these plants from the most suitable localities climatically (perhaps in other better known areas they do not occur in such favourable environments), a greater chance of success may be realized in the future. Also, it was inevitable that in the past some plants died before they reached this country. Living specimens can now be sent home by air in much less time than the sea voyage used to take. The chance of discovering new species is always present, although it is less now than in the earlier part of this century, which was the collector's heyday in the Sino-Himalayan regions. However, as long as the chance is there, it will remain a challenge.

The expedition was indebted to the Nepal Government, who granted permission to enter the country, and facilitated our work in the field. I should also like to express our thanks to the British Ambassador and his staff at Katmandu.

Acknowledgements are made to the trustees of the Godman Fund, and the trustees of the Percy Sladen Memorial Fund, for substantial financial assistance.

POLYANTHUS PRIMROSES

Allan G. Langdon, V.M.H.

MOST members of the genus *Primula* are found distributed in the cooler parts of Europe and Asia and a few in America. It contains many species, some of which are indigenous to Great Britain and are, therefore, easily cultivated in our variable climate, while others, which favour the colder but drier regions of the world, experience difficulty in withstanding our violent climatic changes. Prolonged and continuous cold weather hold few terrors for many plants, but frequent alternating spells of light frosts and thawing with, perhaps, frequent heavy falls of rain, prove too exhausting for them to survive. This is a great pity because we are deprived of the beauty of several species of primulas which would otherwise adorn our gardens and, if some of them were crossed with our native species, might give us a wider range of hybrids in this most fascinating genus.

We are, however, extremely fortunate in that amongst our innumerable native flowers we have the lovely wild primrose, *Primula vulgaris*, and the cowslip, *P. veris*, and in limited numbers and localities the oxlip, *P. elatior*. All of these are held in high esteem not only on account of their individual beauty but because for many people they have considerable sentimental value. They should, however, have a far greater significance for all of us as they are the progenitors of what has become our most useful and widely grown spring-flowering hardy plant, viz. the polyanthus primrose. At least, it is presumed that what has become known as the polyanthus was originally a cross between the common primrose and *Primula variabilis*, itself a cross between the common primrose and the cowslip, or may be its larger cousin the oxlip.

Exactly how and when this presumed cross took place there appears to be no record, but there can be little doubt that the polyanthus is among the oldest of our florist's flowers. Thus, browsing through my copy of MILLER'S dictionary I came across the following under the subheading *Primula*: "There are a great variety of this at present in the gardens, as the Hose in Hose, the double Cowslip, and all the sorts of Polyanthus, which have been so much improved during the past 50 years as to almost equal the variety of the Auriculas; and in some parts of England they are so much esteemed as to sell for a guinea a root." Seeing MILLER compiled his dictionary nearly two hundred years ago it would seem that those who sigh for the good old days do so with some justification after all!

Bearing in mind that the polyanthus has been so long in cultivation, it is strange that comparatively little improvement in the size of flower, range of colour and habit have been made until very recent years. It is well-nigh fifty years ago that I first became interested in them, and whilst my chief horticultural interests have been in other spheres, I have

nevertheless always had great affection for polyanthus, partly, no doubt, because they are the first out-door flowers to open in our establishment.

I well remember in my boyhood days using a half-crown piece as a gauge to measure the size of an individual floret, and one sometimes sees it being used in a similar capacity today, but it would take two half-crowns side by side to span many of the flowers recently introduced. Not that size alone is the most important factor in computing the value and beauty of a flower, but when combined with a pleasing colour, good substance and stiff stems, then it can become a means of considerable enhancement.

Until very recent times the method adopted for improving our strain of polyanthus was by the well-known and generally practised method of discarding the unwanted and marking a few selected plants from which the special stock seed was saved. In this way improvements were unquestionably made, particularly in range of colour and in the general vigour of the strain, while special attention was always paid to freedom of flowering and upright habit. Even so, progress was slower than we had hoped, convinced as we were that polyanthus were inherently capable of producing flowers of far greater beauty than anything which had been previously seen.

Some ten years ago, therefore, we decided that to get anywhere near our goal we should have to control the fertilization of our selected plants. For a year or so this was done out of doors where the plants were flowering, but nowadays they are lifted and potted as this makes the physical work of cross-breeding infinitely easier and also gives a greater measure of assurance that the flowers have not been pollinated by other means.

The physical act of fertilizing polyanthus flowers is a simple operation, but there are several important factors to be borne in mind.

It is generally accepted, I believe, that to stabilize or fix a given characteristic, whether it is colour or habit, in a member of the natural order Primulaceae is a difficult and often very prolonged operation. It most certainly is so in the polyanthus and I can vouch for the fact that it is also in the cyclamen, which, of course, belongs to the same natural order.

As in some other kinds of primula, the flowers of polyanthus are of two distinct forms, the one known as thrum-eyed in which the pistil is low down in the flower tube with the stamens above it, and the other known as pin-eyed in which the relative positions of these reproductive organs are reversed.

These character variations, of course, have to be taken into account in cross-breeding because it has been proved that the most perfect degree of fertility, as shown by the greatest number of seeds and the most vigorous seedlings, is attained when the pollen of the thrum-eyed is transferred to the pistil of the pin-eyed and vice-versa, while the corollary is also true that fertility is incomplete when a flower is self-pollinated.

Anyone engaged in plant breeding must always be on the look-out for breaks, mutations and completely new blood and so it was with restrained

enthusiasm that a few years ago we received some seeds from a friend in California who had been working simultaneously along similar lines to ourselves. These were grown and flowered and some of them did prove useful in adding impetus to our endeavours. We found, however, that considerable caution was needed in the use of these importations as they proved much less hardy than our own and that few of them survived to the second spring after a cold and wet winter. Whilst, therefore, we found them useful in helping to increase the size of the flowers, at the same time we had to be certain that the vigour and hardiness of our strain was maintained as we are adamant in all our plant-breeding activities that vigour shall be given precedence over all characteristics. However, we have also been anxious to increase the colour range and the introduction into commerce of the blue polyanthus in its present elegant form has been referred to as the most momentous horticultural event of this decade. I purposely say in its present form because blue polyanthus were being grown in Bath at least twenty-five years ago to my knowledge and many hundreds of them in varying shades of blue were taken to Bristol and sold in the local market. These blue polyanthus were, in fact, blue primroses which had mutated to produce polyanthus stems, a trait which is inherent in most strains of blue primroses. Their individual flowers were, however, small, the stems thin and the general bearing of the plant not impressive.

The occasional appearance of a pure white in a batch of seedlings of our new blue polyanthus provides the clue that the larger-flowered white was used to give it size and vigour which now equal those of most of the other colours. It is, of course, well known to plant breeders and, incidentally, to laundrymen, that blue and white have a very close affinity, but it is nevertheless remarkable that such a violent break from the colour range usually associated with polyanthus should have proved so comparatively easy to fix. By careful selection and breeding it has been possible to evolve a strain which produces 98 per cent. of blue shades varying from the delightful powder-blues to the deepest Oxford and even indigo. It is gratifying to know that the intrusion of this new colour into a long-established and conventional British plant has been accepted with universal enthusiasm. In some other plants new colour introductions have not had so fortunate a reception. The pink delphinium for instance was given a very mixed welcome and in that I must confess to a personal dislike of it.

Polyanthus are among the easiest of plants to grow to perfection. It is wise to raise them from seed each year, but opinions differ as to whether it is best sown in the autumn or spring. We have long since chosen the autumn as the time most suitable for our requirements but it may well be that the spring sowing will best suit the available facilities of the majority of amateurs. Our main reason for sowing in the autumn is that by so doing we have seedlings ready for planting out into nursery beds in early March, thus enabling us to finish this very large job before our main planting season begins in early April.

We prepare seed-beds of sterilized soil in cold frames and the seed is sown in September. It is well watered and the frames kept closed and fairly dark until germination takes place, after which air and light are gradually permitted. When the rough leaves are produced and when weather permits, the lights are removed and are not again replaced unless extremes of weather make it imperative. At no time do we allow the young plants to be coddled, for the harder they are grown the more suitable they will be for transplanting in March.

There is, of course, no reason why amateur growers should not adopt a similar method, but as most amateurs would only need to sow a small quantity of seed, a seed-box would probably be more suitable than a framed seed-bed, and as seedlings growing in a box would naturally need more frequent attention during the winter months than those in the framed seed-bed, I suggest that spring sowing would probably cause the amateur grower less work and anxiety. But whichever time of year is chosen for sowing, their soil requirements are identical. A fairly stiff loam is the best kind to use, to which should be added a fine sand and a little humus in the proportion by volume of one part sand to four parts loam and a half part of well-decayed manure or leaf-mould. To each bushel of this mixture should be added 1½ oz. of superphosphate or 3 oz. of bone meal, together with sufficient lime to produce a pH of 6·5 or 7.

The loam may be sterilized, but this is not essential. Our main purpose in sterilizing the soil in our framed seed-beds is to minimize the weed population, but weeds would hardly become a problem in a box of seedlings while we always use unsterilized soil in all our cultures where possible.

The seed-box should be 2 inches or 2½ inches deep. A little rubble over the bottom will assist drainage and the box should then be filled with soil mixture to within ¾ inch or an inch from the top and made fairly firm and level. The seeds are broadcast and then covered with ¼ inch of fine soil and again firmed. They should be well watered in after sowing and kept quite moist until after the seeds have produced their rough leaves. Should the soil become at all dry during the germination period much or all of the seed will fail to produce seedlings. The necessity to maintain an even soil moisture during this germination period cannot be overemphasized as I am quite certain that many of those who have found difficulty in germinating these seeds have allowed the soil to become dry after seed-sowing. I would rather see the soil quite sodden whilst germination is taking place than to see it dry even for a few hours.

When the seedlings are large enough to be handled they can be transplanted into boxes which should be at least 3 inches in depth and into a soil similar to that suggested for the seed-sowing with the addition of 2 oz. of hoof and horn to each bushel. Seedlings from the late summer or early autumn sowing may be placed in a cold frame when they have been transplanted and can remain there throughout the winter

provided they are not allowed to become very dry and are given free ventilation with protection from very severe frosts and heavy rain.

Seedlings resulting from sowings made in the early months of the year should be kept growing in a congenial temperature until they are large enough to withstand outside conditions. Care should be taken however to see that they do not become spindly before exposing them to the natural elements.

Whether sown in autumn or spring the seedlings should be ready to plant into nursery beds during April. Choose a North slope or a slightly shaded site in which to plant them and see that the ground is friable yet fairly firm. The addition to the soil of organic matter in the form of well-rotted manure, compost or leaf-mould will be appreciated, but if these are not available a dressing of hoof and horn together with a sprinkling of lime will suffice. All the *Primula* family prefer organic manures to the inorganic as the latter are inclined to scorch the roots and do not approximate so nearly to their natural conditions where they would not survive without access to the decomposed residue of fallen leaves and other organic substances.

When planting the seedlings it is most important that the roots are placed as deeply as possible in the soil and, indeed, the base of the leaves should be buried to a depth of an inch or so provided the crown of the plant is left exposed. At no time during the summer should they suffer through lack of moisture. If they do suffer to any extent their growth will be considerably retarded and they may become prey to greenfly or even red spider, both of which can cause considerable damage.

Planting in their flowering position can be done at any time when the weather is suitable from early September onwards. More often than not it is possible to plant right up to Christmas, especially in the southern parts of the country, though under normal circumstances I prefer to have them all planted by the end of October. It is impossible to have polyanthus at their best unless the soil is well prepared as suggested for the nursery beds, and while they will give a good account of themselves in the most inhospitable places, they make a magnificent blaze of colour if their comparatively modest needs are fulfilled.

A stroll along a country lane in the early spring will soon give the clue to the aspect primroses prefer, and it will be seen that whilst there may be thousands of them on the banks facing north or north-west, there will be none at all on the opposite bank. If, therefore, it is possible to choose a cool site for polyanthus it is best to do so as they appreciate similar conditions to the primroses, but it would be fastidious to insist upon it.

I would like to quote again from MILLER's dictionary: "As the plants which arise from seeds generally flower much better than off-sets those who would have these flowers (Polyanthus) in perfection should annually sow their seeds." Though I must admit complete agreement with MILLER I do not suggest that once the plants have flowered they should be discarded as useless; indeed, there is no reason why annual divisions

made from them should not survive for many years, though their flowers will, in the main, be smaller than those produced by the original seedlings. The best time to divide them is as soon as possible after they have finished flowering. They should be lifted carefully so that as few roots as possible are broken and then cut into sections with a good root system to each. All the fully developed leaves can be cut off leaving the strong crown or crowns unimpaired. Choose a moderately shady place for re-planting and make sure they are planted well down in the soil as the new roots will be produced very near the crowns and if exposed the plants will suffer in very dry weather and might fail to survive. During the summer treat them in the same way as I have suggested for the seedlings and by the autumn they should have made strong healthy growth and be ready to re-plant in their flowering positions.

It appears that few amateurs realize the potentialities of the polyanthus as a cool or even cold greenhouse plant and I am sure that if they were once tried for that purpose they would become as popular for early spring pot culture as some of the other members of the *Primula* family—probably more so as their needs are more modest. The best plants for this purpose are one-year-old unflowered seedlings lifted from the open ground. Divisions from older plants are quite unsuitable.

Most garden soils will do as a potting medium, provided they are in a friable condition and have had some humus added to them. Lifting and potting can be done at any time during the winter or early spring and I have even seen plants lifted with buds showing, but which have made lovely pot plants and shown no signs of distress through having their roots disturbed. The main points to remember in growing polyanthus in pots are: (1) they must never be allowed to suffer through lack of water; (2) it is useless to try to force them in a high temperature. The result of so doing is excessive foliage with few weak-stemmed flowers. On the other hand if well-developed plants are potted into 5- or 6-inch pots and kept moist in a well-ventilated house in an average temperature of about 45°, well-flowered plants can be had in March and April whose scent alone will amply reward the very limited cultural attention they demand.

THE PARENTS OF THE GERANIUM

Derek Clifford

THERE is a well-publicized tradition that the parents of that branch of cultivated pelargoniums known as *Pelargonium hortorum* or "zonal geraniums" were the two South-African species, *P. zonale* and *P. inquinans*. It has been supposed that from *P. zonale* came the distinctive zone or banding of dark colour which is present in the leaf of many, though not of all garden geraniums, and that the particularly vivid colour of the geranium flower is contributed by *P. inquinans*. This,

which sounds suspiciously like an over-simplification, can now be shown to be so.

A recent importation of seeds and cuttings of these two and many other pelargonium species collected by MRS. ISAAC of Cape Town University shows that *P. inquinans* and *P. zonale* are very variable. *P. inquinans* is not by any means always remarkable for its brilliance of colour, while its leaf, of the typical geranium shape, is sometimes zoned and sometimes not. There was thus no need for *P. inquinans* to apply to *P. zonale* for the distinctive band of dark colour—it already existed in *P. inquinans* and, moreover, of the several specimens of *P. zonale* that I have seen, the zone, although present in every case, is not particularly well marked in any.

The best zonal marking, the most perfect example of the desirable geranium leaf, in form, in texture and in colour, is to be found in the seedlings raised from yet another species, *P. scandens*. Of the seven seedlings so far developed of *P. scandens* all (allegedly from the same parent) reveal distinct differences, but in each one the customary zone is very much more distinct than in either *P. inquinans* or *P. zonale*, although in one case the zone is, in fact, not a zone at all but a solid block of darkness in the centre of the leaf. One glance at this batch of seedlings is sufficient to show where the most significant parent of our garden geranium is to be found. Here certainly is the exact leaf of 'Mrs. Tarrant,' a cultivar well known as possessing classical perfection of foliage and style of growth. Here, too, we can recognize the leaf of that admirable new American variety 'Lullaby.' And surely it is from *P. scandens* also that the so-called black-leaved varieties 'Red Black Vesuvius' and many others, about to be more widely cultivated, of this type, are descended. Their dwarfness, their free breaking growth are all characteristic of this parent but not of either *P. inquinans* or *P. zonale*.

If, as some suppose, *P. scandens* and *P. frutetorum* are identical, or, rather, if *P. frutetorum* is merely a particular form of *P. scandens*, then its parentage of the variety 'Salmonia' or 'The Boar' (not to be confused with *P. salmoneum*) has already been suspected in America, but the seedling which gives the strongest indication of 'Salmonia' is an African hybrid form of *P. inquinans*; perhaps this is the true *P. frutetorum* after all?

Of the remaining 200-odd pelargonium species only five others can be suspected of having a hand in the modern list of zonals. There are an increasing number of what are known as zonal × ivy hybrids which, for the most part, are grouped separately, but of which some cultivars are appearing which partake so clearly of normal zonal characteristics that they are certain to be lumped together with them; of these the old 'Mme. Charmet' and the new American 'Milky Way' are recognizable examples. It is in this way that the parents of the ivy-leaf section, *P. peltatum* and *P. lateripes*, come into the zonal family tree, although, as yet, I believe their contribution is slight. Then there is that curious non-flowering silver-leaved variety 'Mme Salleron' which sports

frequently the flowering form 'Little Trot' and also a green-leaved form. The green-leaved sport at once betrays the parentage of *P. ranunculophyllum* which until this year has not been seen in England for many seasons, if, indeed, it has ever been here before.

Some other parentage may be deduced also for the erect glossy-leaved 'Irma' suspected of being a hybrid ivy until consideration of the habit of *P. betulinum* and *P. acetosum* suggested that one of these had introduced so distinctive a characteristic. Perhaps also it is to one of these that we must look for the parentage of 'Skelly's Pride,' sometimes known as 'Salmon Fringed' or as 'Flame' or as 'Blaze,' with its glossy leaf and notched petals, but frequently as this cultivar throws stems which are conventional in leaf and form it never betrays the other side of its extraction. I think there is little doubt that *P. acetosum* is the other contributor in both these cases.

The only other recognizable contribution is the undesirable one of *P. monstrum*, Sweet, Vol. 1, p. 13. This regrettable strain is evident in the coarse growth and undependable flowering qualities of 'Purple Prince' and may also be responsible for the less attractive habits of that otherwise exquisite geranium 'Mlle Gautier.'

So of the 200-odd species of pelargonium we can only trace in our garden geranium three major contributors and four minor ones; what of the parental potential of all the others? Some three or four have perhaps contributed to *P. domesticum*, the regal pelargonium of today. Four or five more can be traced amongst the scented-leaved types and that group loosely known as the 'Uniques,' but the great majority of pelargonium species with widely differing characteristics remains unexploited. There is undoubtedly a wealth of new types to come.

HARDY FERNS—I

OSMUNDA REGALIS, THE ROYAL FERN

Gerald Perry

> "That tall fern
> So stately, of the queen Osmunda named;
> Plant lovelier, in its own retired abode
> On Grasmere's beach, then naiad by the side
> Of Grecian brook, or Lady of the Mere,
> Sole sitting by the brooks of old romance."

OSMUNDA REGALIS, the royal or flowering fern, is, in common with all other hardy ferns, sensitive to careful cultivation, and repays that consideration which consists, not in expensive outlay, but rather in a careful study of the plant's likes and dislikes. It is easily cultivated in

any moist place, such as the side of a stream or lake, or by an artificial garden pool, and will attain its natural luxuriousness in full sun or partial shade provided it is planted in damp, peaty soil and never lacks for moisture during the growing period.

This stately fern, the sole British representative of the natural order Osmundaceae, is undoubtedly the most conspicuous of all our native ferns, and attains majestic proportions. The usual length of the fertile fronds is about 3 feet, but the barren ones, which are much more numerous, attain an average of about 5 feet or even more when grown in a particularly favourable position. It is recorded that plants 10 feet high have been found on the banks of the Clyde, in Devon and in Killarney in Ireland.

The royal fern is distinguishable at first sight from all other native kinds by its particularly massive fronds. These are furnished with broad, somewhat heart-shaped and almost stalkless pinnae of a light glaucous green colour. It is equally distinct from all other native ferns by the peculiar conformation of its fertile fronds, which have caused it to be sometimes—although erroneously—called the flowering fern. The pinnae at the upper portion of these are so densely covered with brown clusters of capsules, as to appear at first sight something like the spikes of Astilbe flowers. The basal parts however, are in all respects similar to those of the barren ones. These fronds arise from a stout tufted caudex or crown, which often develops upwards so as to resemble a miniature "tree fern." This trunk in old plants is sometimes 18 inches or more in height; at other times it extends horizontally, or nearly so for about the same length. This rootstock has been employed in medicine.

GERARD stated, "The roote, and especially the hart or middle part thereof, boiled or else stamped and taken with some kind of liquor, is thought to be good for those that are wounded, that have fallen from some high place; and for the same cause the Empericks do put it in decoctions, which the late Phisitions do call wounde drinks; some take it to be so effectual, and of so great a vertue, so that it can dissolve cluttered blood remaining in any inward part of the bodie, and that it also can expel or drive it out of the wound." In the Lake District, where the plant was known as the bog onion, the caudex was beaten and covered with cold water, and allowed to remain overnight. By morning a thick starchy fluid resulted which was used to bathe the parts affected. This was also used for rickets in children. The fluid was also used by the North-American Indians as a substitute for starch. In Japan the young tender shoots were gathered when about a foot high and sun-dried, later to be bundled in asparagus fashion and stored for winter use, when they were employed for the thickening of soups.

The medicinal properties of the *Osmunda* are extolled by other old writers as having "all the virtues mentioned in other ferns, and is much more effective than they both for inward and outward griefs and is accounted good on wounds, bruises, or on the like. The decoction to be

drunk, or boiled unto an ointment of oil as a balsam or balm; and so it is singular good against bruises and bones broken or out of joint."

The young fronds which appear in May are matured by August and destroyed by the early winter frosts. But, during late August and September these dying fronds change from green to a light russet brown, and the beauty of the autumnal tints alone should justify the planting of this beautiful fern in the garden.

Both barren and fertile fronds are borne on smooth stems which are reddish when young but turn pale green with age. The leaf sprays are thin and crisp, of a bright sea-green colour, assuming a deep green as the plant ages. They are lanceolate and twice pinnate, with the pinnules oblong and nearly egg-shaped. The barren fronds are leafy throughout, but differ in no other respect from the fertile ones.

It is worth noting that the spores are bright green when ripe and that they are shed very early, usually in late May or early June. When the masses of spore cases in the flower-like heads look brown and ripe, it is usually too late to obtain any fruit. The spores of most hardy ferns remain fertile for many years, but the *Osmunda* is an exception to this rule, losing its power of germination in a few days.

Propagation is an interesting operation with all plants and especially so with hardy ferns. The first step lies in securing a fertile frond before the spore cases have opened. Place this on a clean sheet of paper in a warm place overnight. By morning the cases will have burst and the light green spores scattered on the paper. These should be sown at once.

The pots for sowing should be well drained. For this purpose it is advisable to use a mixture of small pieces of broken flower-pot and lump charcoal about the size of a filbert nut. Cover the base with this and then fill the pot to within an inch of the top with rather stiff loam (previously sterilized and passed through a fine-meshed sieve). The compost should be pressed down firmly and watered by the immersion method. After surplus moisture has drained off, the spores can be carefully dusted on the surface and a piece of glass or bell jar placed over the top. Nothing more will be necessary than to keep the soil constantly moist. This can be done by placing the pot in a saucer of water.

Germination takes place within a few weeks, and as the young plants develop later in the year they should be removed with a sharp-pointed stick or the tip of a pen nib. There will probably be quite a number in each clump and these should be transplanted into small pots where they will have room to spread. This thinning should be repeated as occasion arises until the plantlets make fronds and are sufficiently large to be placed singly in small pots. Up to this time the plants require great care and attention in the matter of water and air, but after a few fronds have developed they will respond to ordinary treatment. By the end of the third season they should be about 4 inches high and strong enough to be planted in their permanent positions.

The royal fern is almost cosmopolitan in its distribution, being

widely spread throughout the continent of Europe, from Scandinavia in the north to Italy and Spain in the south. In Asia it occurs in many parts of India, and is found also in the United States of America, Canada and Newfoundland. In South America it grows in the Organ Mountains and it is also recorded that large colonies are to be found on the banks of the Uruguay.

MR. NEWMAN speaks of the impression which the flowering fern, fringing the river between the lakes at Killarney, made upon the great Scottish novelist. "One of the boatmen employed by SIR WALTER SCOTT," he says, "on the occasion of his visit to Killarney, told me that SIR WALTER scarcely uttered a syllable in praise of the scenery until he came to this spot; and here he stopped the rowers and exclaimed, 'This is worth coming to see!' The boatman evidently thought very meanly of SIR WALTER'S opinion, whom he considered in duty bound to be in raptures with the lakes and mountains. I do not wonder at the great man's taste: to me it appeared the most wonderfully beautiful spot I had ever beheld, and this beauty is mainly owing to the immense size and number of these pendent fronds."

The species has produced but few varieties, probably the only ones in cultivation today being *cristata* and *purpurascens*. Of the former, DRURY states, "Osmunda *regalis cristata*, which found its way to a nursery in the winter time (probably about 1880) in a batch of common ones, and thus deprived its finder of the thrill of delight its discovery should have afforded, and leaving that pleasure to MR. G. B. WOOLASTON who 'spotted' it afterwards at the nursery for the first time, but failed to become its owner despite a bid of £25, for those were the happy days when the hardy ferns were appreciated and the nurserymen knew it."

This variety differs from the type plant by having the ends of the fronds and all the pinnaea finely crested (Fig. 7).

O. regalis purpurascens is easily recognizable from the type plant by the deep coloration of the main stems and branchlets. Both these varieties breed true from spore.

The other recorded varieties are *corymbifera* which we grew at Enfield many years ago. This variety was curiously forked and crested but otherwise very similar to the type plant. *Gracilis*, now a very scarce form, is very slender in all its parts and a joy in spring-time, when its graceful young fronds are tinted a beautiful soft bronzy-pink. Of var. *palustris* I can say little beyond the fact that it requires greenhouse treatment in this country and that probably future scientists will elevate it to specific rank.

O. regalis is probably our oldest recorded fern. The first notice I find in hunting through old books, is in GERARD'S *Herbal* of 1597, where he speaks of the existence of handsome species which, he states, "groweth in the midst of a bogge, at the further end of Hampsteede Heath from London, at the bottome of a hill adjoining to a small cottage, and divers other places, as also upon divers bogges on a heath or common neere unto Burntwood [Brentwood] in Essex, especially neere unto a place

there that some have digged, to the end for to finde a nest or mine of golde: but the birds were over fledge, and flown away before their wings could be clipped." From the Hampstead locality it soon disappeared; for JOHNSON, writing of this location less than forty years afterwards, says that it was not then to be found.

The origin of the name Osmunda, or as the old writers called it "Osmund Royal" is shrouded in mystery. Many suggestions have been put forward, but few carry conviction. Some see in it a reference to the god Thor and his name Osmund or Osmunder. SIR J. E. SMITH says it " appears to have originated in England: Osmund in Saxon is the proper name of a man, said to mean domestic peace." MINSHEU brings forward the suggestion that it may have been so called because of the decoction so employed as a mouthwash (Ad. os. mundanum). Another writer suggests that it is the corruption of the German *gross Mond-kraut*, referring to the greater moonwort.

Various legends have also grown up concerning historical associations with the plant, the following being a fair sample of these doubtfully authentic tales: "Many years ago at Loch Tyne dwelt the waterman old Osmund with his wife and daughter. Fairest amongst maidens was this daughter. Her light brown hair and glowing cheek told of her Saxon origin, and her light steps bounded o'er the green turf like a young fawn in its native glades. Often in the stillness of a summer's evening the mother and child would sit beside the lake to watch the dripping and splashing of the father's oars as he skimmed towards them over the deep waters.

"But alas, one day sounds as of hasty steps were heard, and presently a company of fugitives told with breathless haste that the cruel Danes were making for the ferry. Osmund heard these tidings with fear. Suddenly the shouts of furious men came remotely on the ear. The fugitives rushed on. Osmund stood for a moment; then snatching up his oars he rowed his trembling wife and fair child to a small island covered with the great Osmund Royal, and, helping them to land, bade them lie down beneath the tall ferns. Scarcely had the ferryman returned to his cottage when a company of Danes rushed in; but they hurt him not, for they knew he could do them service. During the day and night Osmund rowed backwards and forward across the river, ferrying troops of those fierce men. When the last company was put ashore, Osmund, kneeling beside the river's bank, returned heartfelt thanks to Heaven for the preservation of his wife and child. Often in after years did Osmund speak of that day's peril; and his fair child, grown up to womanhood, called the tall fern by her father's name."

Photo, L. H. J. Williams

1954 EXPEDITION TO NEPAL

FIG. 1—Bright red form of *Meconopsis regia* collected by MR. L. H. J. WILLIAMS at 14,000 feet (See p. 6)

Photo, J. E. Downward

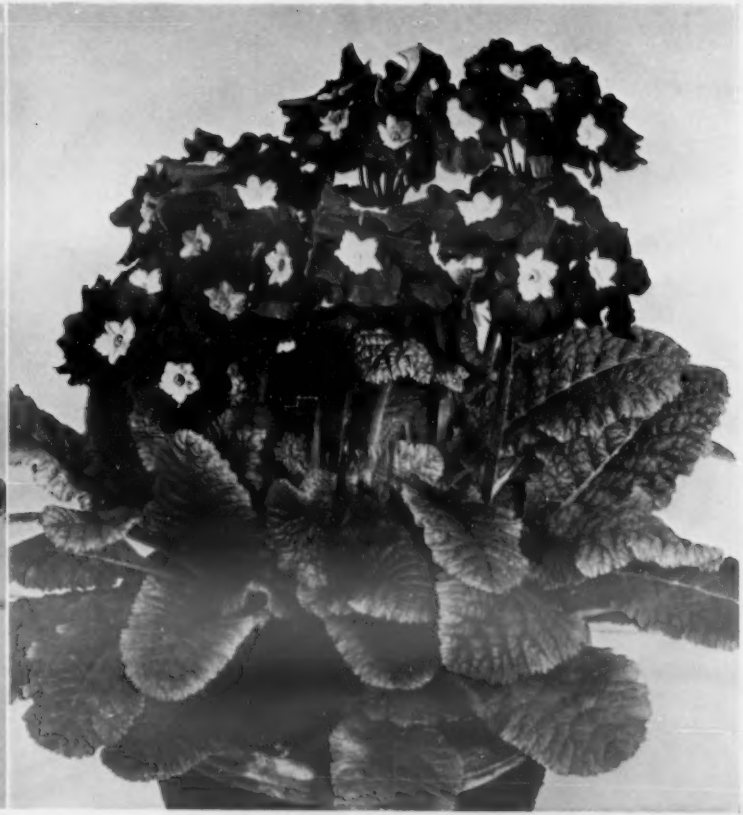
FIG. 2—Part of an exhibit of autumn fruits and coloured leaves shown by The Commissioners of Crown Lands, Windsor Great Park, at the Autumn Show held on October 18, 1955, for which the Holford Medal was awarded. In front is *Vitis vinifera* 'Brandt'

In front is *Vitis vinifera* 'Brandt'

Photo, J. E. Downward

POLYANTHUS

FIG. 3—An exhibit of finely grown Polyanthus shown by Messrs. Blackmore & Langdon (See pp. 15–20)



Photos, West Advertising Ltd.

FIG. 4—Polyanthus 'Langdon's Pink'

FIG. 5—Polyanthus 'Langdon's Blue'

OSMUNDA REGALIS, THE ROYAL FERN

FIG. 6—*Osmunda regalis*

Photos, J. E. Downward

FIG. 7—Crested form of *Osmunda* on the right for comparison with a frond of the ordinary form on the left (See p. 25)

Photos, Shell Photographic Unit

THE SPRUCE PINEAPPLE GALL ADELGES

FIG. 8—Cluster of eggs of *A. abietis* at base of buds in spring. The "wool" covering has been partly removed to expose the eggs (See p. 30)

FIG. 9—White flocculent "wool" surrounding Adelgids at base of buds in spring (See p. 30)

Photo, R. P. Scase

FIG. 10—The galls present during June and July (See p. 30)

Photo, Shell Photographic Unit

FIG. 11—Clusters of eggs of *A. abietis* with remains of adult surrounding lowest cluster (See p. 30)

1954 EXPEDITION TO NEPAL

FIG. 12—*Stellera chamaejasme* (See p. 7)

Photos, L. H. J. Williams

FIG. 13—*Geranium collinum* (See p. 7)

PLANTS AND PROBLEMS—XXI

PRUNING A BANKSIAN ROSE

Question. My husband planted a yellow-flowered banksian rose on the south wall of our house three years ago. It has grown enormously but never flowered although we have left it unpruned. Can you please tell me why this is so?

Answer. The yellow-flowered banksian rose, *Rosa banksiae* 'lutea,' is naturally a plant of vigorous habit and, particularly when young, it can make annual growth up to 8 or 9 feet in length. When grown against a wall these young shoots must be tied in because it is from these that the flowering shoots will appear after about three years. Unlike most roses, this one does not flower until it has made a considerable amount of mature growth. When it does start to flower, then the patience necessary for its cultivation is amply rewarded. As the plant gets older the annual amount of growth made each year will decrease and then the only pruning necessary is the removal of old, weak or unwanted branches, to encourage fresh growth to break from near ground-level.

PRUNING MORELLO CHERRIES

Question. In a garden I have recently taken over are two morello cherry trees. I understand these require different pruning treatment to sweet cherries. Would you please tell me what this entails?

Answer. Morello cherries fruit only on one-year-old wood and so a maximum of young wood must be encouraged by judicious pruning and manuring. Every year a proportion of older branches should be cut hard back to a growth bud. If this is delayed until the spring, such buds are easily seen, whereas earlier pruning may result in cutting back to a point from which no growth will develop at all. Obviously the number of branches to be so treated in any one year will depend on the size of the tree. As an approximate guide not more than one-third of the number should be pruned, so that in effect the whole branch system is renewed every three or four years. Trees of morello cherry that are not pruned and manured regularly soon lose vigour and frequently die off without warning.

THE FRUIT TREE RED SPIDER MITE

Question. Could you please tell me if the reddish-brown marks on this apple wood are eggs and, if so, what are they and what would be the correct spray to use on them?

Answer. As you suspect, the reddish appearance of the apple twigs is due to the presence of masses of eggs; in fact, they are the winter eggs of the fruit tree red spider mite, *Metetranychus ulmi*. They begin to hatch out in May, giving rise to immature mites which feed on the underside of the leaves. After moulting three times,

they become mature and the females deposit the summer eggs on the undersurface of the leaves. The complete life-cycle takes about a month and there are five generations each year. By July or August a large population of mites often builds up, with the result that the leaves become silvery or bronzed. In severe infestations premature defoliation occurs. Control may be achieved by applying either delayed dormant washes or summer sprays. Thus DNOC may be applied during the first two weeks of March as an alternative to tar oil winter wash. Otherwise, one or other of the new acaricides, sold under the names of Chlorocide or Ovotran, may be used during June. Two applications are usually recommended but the makers' instructions should be followed.

THE VAPOURER MOTH

Question. I should be grateful if you would identify the blight on my apple trees this year. I enclose specimen twig—neither the gardener nor I am familiar with it.

Answer. The specimen found on the apple leaf was the egg mass of the Vapourer Moth, *Orgyia antiqua*. The eggs, which may number as many as 250, are laid in the autumn. They hatch the following May or June, giving rise to caterpillars which feed on the foliage. The hairy caterpillars are handsome creatures and are characterized by the presence of four large yellow tufts of hairs along their backs. When fully fed in August they pupate on the leaves or twigs within a conspicuous silk cocoon. The adult moths emerge a few weeks later, and, since the females are wingless, the egg masses are laid attached to the cocoons from which they emerged. Most types of top and bush fruits are subject to attack, as also are roses. Generally the insect is not sufficiently abundant to cause extensive damage, but it is advisable to remove the egg masses whenever they are seen during the winter. The routine tar oil winter washes on fruit trees effect a partial control. The caterpillars may be destroyed on rose bushes by spraying or dusting the foliage with DDT.

"SHANKING" IN GRAPES

Question. Why do some of my bunches of grapes bear berries which shrivel and taste sour?

Answer. We believe you are referring to the trouble called "Shanking," which seems to be fairly common on vines in small greenhouses. Shanking first shows when the small stalks of individual berries begin to wither and turn black so that the berry shrinks and turns sour. This condition is not a disease but is believed to be connected with malnutrition owing to unsatisfactory root action. Overcropping and incorrect pruning may also aggravate the trouble. It is essential to be sure the soil is properly drained so that there is no risk of water-logging, to provide the proper foods and to avoid overcropping.

Where the trouble is severe it may be necessary to remake the border containing the roots. The proper cultivation of vines is dealt with in the booklet issued by the Society, entitled "The cultivation of Apricots, Peaches, Nectarines, Figs and Grapes," by J. Wilson. This is obtainable from the Secretary, R.H.S. Offices, Vincent Square, London, S.W.1, and the price is 1*s.* 9*d.* post free.

NOTES ON THE BIOLOGY AND CHEMICAL CONTROL OF THE SPRUCE PINEAPPLE GALL ADELGES

V. W. Fowler, B.Sc., A.R.C.S., R.H.S. Gardens, Wisley, and R. Gair, B.Sc., N.A.A.S., Shardlow Hall, Derby

INTRODUCTION

THE Spruce Pineapple Gall Adelges, *Adelges abietis* L., has been known as a pest of spruce on specimen ornamental trees and in forest nurseries for a very long time; in fact, the galls of this species, or those of a closely related one, were observed by the Dutch botanist, CLUSIUS, in 1583 (8), but it was not until the eighteenth century that it was discovered (LINNÉ, 16) that insects were associated with the galls. STEVEN (20) gives references to the papers of earlier European and Russian workers.

The insect produces the familiar pineapple-like galls which partially or completely encircle the basal part of the shoots. Occasionally the shoots are killed or considerably shortened, but usually they continue to grow with a tendency to bend over towards the side which bears the gall. The number of galls per tree varies greatly, some being heavily infested whereas others immediately adjacent to them may be completely free of attack. The factors responsible for this irregular pattern of infestation are not known. The greatest number of galls found on a single tree during counts made at Woking on 220 infested trees 2–3 feet in height was 201 and the average number of galls per tree was eighteen. The classic example of severe infestation was given by PATCH (18) who reported 990 galls on a white spruce 3 feet in height in the United States.

Norway spruce (*Picea abies* (L.) Karst.) is now grown extensively in various parts of the country to meet the demands of the Christmas tree market. The Spruce Pineapple Gall Adelges has become an important pest of Christmas trees in recent years because of the intensive cultivation and inadequacy of previous control measures on many nurseries. The presence of galls and the resulting distortion of the shoots greatly reduce the market value of the trees. The concern of the growers was such that two experiments, one at Send, near Woking, Surrey (conducted by V. W. F.), and the other at Darley Dale, Derbyshire (R. G.), were

initiated quite independently and the present article combines the result of these trials.

NOTES ON THE BIOLOGY OF *A. ABIETIS*

The life-history was first elucidated towards the end of the nineteenth century by continental and Russian workers. BURDON (3, 4) brought their observations to the notice of investigators in this country and STEVEN (20) later carried out research in Scotland. It is proposed here to mention only those parts of the life-cycle which have a bearing on control measures, together with some of the present authors' observations.

CHOLODKOVSKY (5, 6, 7) and many subsequent authorities considered that the insect exists in two races, named *A. abietis* L. and *A. viridis* Ratz., differing in that the former remains on the spruce throughout its life-cycle, whereas *viridis* migrates in summer to larch on which it remains until the autumn of the following year. Other workers, notably DREYFUS (9), BÖRNER (1, 2) and SCHNEIDER-ORELLI *et al.* (19), consider the two forms to be merely parallel development cycles of one species, *A. abietis* L. The name *viridis* Ratz. has accordingly been sunk.

Whatever the true status of these forms of the pest, they are both present at the Darley Dale nursery, although the migratory form is the more abundant. Several larch trees growing in close proximity to the nursery are heavily infested. On the other hand, only the non-migratory form has been observed at the Woking nursery, which has no larch trees in its vicinity.

The first-stage larvae (fundatrices) overwinter at the base of the buds. In late March or early April they commence the first of three moults (noted on March 23, 1954, and April 2, 1955, at Woking) and reach maturity to become stem-mothers a few weeks later, during which period they produce copious amounts of a white "woolly" material (Fig. 8). About two weeks later, the stem-mothers (first noted April 18, 1954, and April 22, 1955, at Darley Dale) lay greenish eggs in groups of fifty or more. The eggs, which have a protective covering of flocculent "wool" (Fig. 9), were first observed on the Woking plots on April 21, 1954, and April 25, 1955, and at Darley Dale on April 29, 1955. Hatching commenced in the second week of May at both sites in 1955 and a week earlier in 1954, giving rise to tiny green larvae. The feeding of these larvae and stem-mothers results in the development of the typical "pineapple" galls, throughout June (Fig. 10). The nymphs living within the galls emerge in late July and early August and give rise to winged migrants which either move to larch or settle down on spruce needles. Those remaining on the spruce take up a position on the upper surface of the needles and within a day or so commence egg-laying. After depositing twenty to fifty yellow eggs the adults die in such a position that their wings remain around the egg cluster (Fig. 11). About three weeks later the eggs hatch, giving rise to small yellow larvae (fundatrices) which crawl to the base of the buds to overwinter.

PREVIOUS CONTROL MEASURES

Hand-picking of the galls from the spruce trees every July or August has been done assiduously on both nurseries without apparent success. On the Darley Dale nursery tar oil winter washes were used in the years preceding 1939, but the nursery is so exposed to wind and frost in wintertime that very few days are suitable for applying winter washes and in any case the amount of scorch damage to the trees was so great as to rule out this method of control. Spring washes of nicotine were also tried in pre-war years, but the grower reported little success from their use.

Tar oil and nicotine sprays have been mentioned by various American workers, including FRIEND (11), FELT and BROMLEY (10), HERRICK (14), GAMBRELL (12) and PARROT *et al.* (17). Lime sulphur gave a good measure of control according to HERRICK and TANAKA (15), but left an unsightly white deposit. GAMBRELL (13) found DNOC effective but causing injury to the foliage. Several of the above used various miscible oils as autumn or spring treatments.

WOKING EXPERIMENTS

Several nurseries in Surrey grow Norway spruce for the Christmas-tree market. The practice on the nursery where the experiments were conducted is to buy seedling trees as "four by two's," i.e. as trees which have been two years in the seed-bed and then transplanted for another two years, and grow them on for a further three or four years, when they reach a height of about 3 feet—a suitable size for marketing. The trees are planted approximately 18 inches apart and a similar distance between the rows, giving a stand of about 20,000 trees per acre. The trees are most severely attacked by the adelgid during their last year in the nursery.

1954 experiment

The object of this preliminary experiment was to test the efficiency of a number of insecticides with a view to selecting the most promising ones for a trial in the following year. The substances and the dates on which they were applied are as follows:

BHC 15 per cent. miscible at 0·05 per cent. on April 9.
Nicotine 97–98 per cent. at 0·05 per cent. on April 9 (plus wetting agent).
Parathion 20 per cent. at 0·01 per cent. on April 6.
Mazidox 40 per cent. at 0·2 per cent. on April 6.
Dimefox 50 per cent. at 0·01 per cent. on April 6.

One gallon of the dilute washes was sufficient for twenty to thirty trees. The weather on both days of application was fine and sunny, with light north-east winds, following a night frost.

The experiment was designed in a randomized block layout and was replicated three times. The individual plots contained twenty trees and the whole experiment, including control plots, totalled 360 trees. At the

time of spraying, many of the larvae had undergone their first moult. All the insecticides were applied as foliage sprays using a knapsack sprayer, but owing to a faulty machine the spraying was not completely efficient.

Results

Originally it was intended to take random samples of galls, but in view of their irregular distribution it was decided to count all the galls present. To avoid confusion the galls were removed as they were counted and the results as measured on August 4–5 are given in Table I.

TABLE I

Treatment	*Total no. galls on 60 trees*	*Average no. galls per tree*
BHC . . .	80	1·30
Nicotine . .	212	3·53
Parathion . .	243	4·05
Mazidox . .	322	5·37
Dimefox . .	393	6·56
Control (untreated) .	471	7·85

These results suggested that BHC was the most promising insecticide. Since toxic hazards are involved in the application of the organophosphorus insecticides (parathion, mazidox and dimefox) it was decided not to use these materials the following year.

1955 experiment

A similar randomized-block experiment was laid down, the individual plots being increased in size to include forty trees and only three materials, namely nicotine and BHC as spring washes and tar oil winter wash, were used. Buffer rows were left between the plots to avoid risk of contamination through spray drift. The experiment was replicated four times. The rate of use and dates of application are given below:

Tar oil winter wash at 5 per cent. on February 10.
BHC 15 per cent. miscible at 0·05 per cent. on March 30.
Nicotine 97–98 per cent. at 0·05 per cent. on March 30 (plus wetting agent).

The weather conditions on February 10 were mainly sunny, rather cold, with a light north-west breeze and on March 30 early frost was followed by moderate easterly winds with some cloud. Once again the spring washes were applied when most of the larvae were in the second stage. Instead of a knapsack, a small power sprayer was used at a pressure of 200 lb. p.s.i., about 6 gallons of dilute wash being applied per 160 trees.

Results

The galls were counted on July 13 and August 4 and 5 and the results are given in Table II.

TABLE II

Treatment	*Total no. galls on 160 trees*	*Average no. galls per tree*	*Percentage trees with galls*
Tar oil (February 10)	29	0·2	11·3
BHC (March 30)	16	0·1	5·0
Nicotine (March 30)	1,227	7·7	70·6
Control (untreated)	3,488	21·8	80·6

DARLEY DALE EXPERIMENTS

Norway spruce is grown extensively on a nursery 1,100 feet above sea-level at Darley Dale in Derbyshire. The plants are grown from seed, transplanted twice after two and four years and grown until they are eight to ten years old, when they are lifted and sold as Christmas trees. For the past thirty years the trees have been more or less infested with adelgids every year and the pest is said to be particularly abundant after short, mild winters. The amount of damage, even in a "good" year, is enough to cause substantial economic loss. Not only do the galls have to be hand-picked from attacked trees every summer, but at lifting time several hundred badly distorted trees are burnt and many more sold at greatly reduced prices. The best-sized tree for the market is 5 feet, but because of the risk of infestation the grower normally sells the trees before they have reached this height.

1954 experiment

A trial was laid down at Darley Dale using the systemic insecticide demeton on trees of two ages (*a*) four-year-old trees in their first year after planting out and (*b*) seven- and eight-year-old trees ready for sale in the autumn of 1954.

A randomized block design was used with two replications for the trees of each age group and each block contained 140 trees.

The insecticide was applied on June 3 as a 0·2 per cent. solution in one of three ways (*a*) watering the roots (*b*) painting the stem and leaves with a brush dipped in the insecticide and (*c*) spraying the foliage with a knapsack sprayer.

Results

Gall counts of all trees were made on September 28 and the results are given in Table III.

TABLE III

Demeton treatment	*Average no. of galls per tree*	
	Four-year-old	*Seven-year-old*
(*a*) Watering roots	0·11	18·5
(*b*) Painting stem and leaves	0·13	16·5
(*c*) Spraying stem and leaves	0·08	17·0
(*d*) Control (untreated)	0·10	18·0

Systemic insecticides are best used when plants are growing actively and the negative results may have been due to the use of the material at a late date. Because of the considerable toxicity hazards, demeton was excluded from further trials. Very few galls developed on the four-year-old trees, which is consistent with the widely held view that *Adelges* spp. are not important on such young stock.

1955 experiment

FOWLER, working on the same problem in Surrey, reported privately that a single spring application of BHC had shown promise there in 1954. It was therefore decided to use this substance at Darley Dale in the 1955 work. A spring wash of endrin and a winter wash of tar oil were also included in the trial. The layout was of a randomized block, with four replicates of each treatment except endrin (single replicate) on trees aged nine or ten years and two replicates of each treatment (excluding endrin) on the five-year-old trees. The number of trees per treatment per block varied a good deal according to the layout of the nursery, but averaged 120 trees.

Single applications of the following treatments were made on the dates shown below.

Tar oil winter wash at 4 per cent. on January 24:

BHC 50 per cent. dispersible at 0·05 per cent. on April 1.

BHC 50 per cent. dispersible at 0·05 per cent. on April 15.

BHC 50 per cent. dispersible at 0·05 per cent. on April 29.

Endrin 19·7 per cent. emulsion at 0·05 per cent. on April 29.

A little succinate wetting agent was added to each dilution of BHC and endrin, but any efficient wetter could have been used.

Weather conditions on January 24 were fine and calm and there was no frost on the trees. On April 1 and 15 it was fine and sunny, with a slight south-west breeze. On April 29, heavy rain fell immediately before and during the 48 hours after spraying.

Results

The number of galls formed on the five-year-old trees were so few (two trees with four galls out of 621 trees) that the two replicates on these younger bushes have been disregarded in the following considerations.

The effect of the various treatments in suppressing adelgid populations on the older trees was assessed in two ways, (*a*) by counting the colonies of the insect on May 11 and (*b*) by noting the number of galls on the foliage on August 2.

Counts are summarized in Table IV below.

TABLE IV

Treatment		Colony counts May 11		Gall counts August 2	
		No. trees examined	*Percentage trees with colonies*	*No. trees examined*	*Percentage trees with galls*
Tar oil	(January 24)	113	6·2	249	12·5
BHC	(April 1)	335	1·2	680	1·8
BHC	(April 15)	352	1·7	546	2·4
BHC	(April 29)	115	14·8	289	8·6
Endrin	(April 29)	73	32·9	73	27·4
Control	(untreated)	122	49·2	298	27·9

Several dead or moribund colonies were noted on the trees treated with BHC on April 29, in spite of the inclement weather at the time of spraying. Relatively few dead colonies were observed on the trees treated with endrin on the same date.

CONCLUSIONS

Each of the following substances was applied to Norway spruce in attempts to control damage caused by *Adelges abietis* L. BHC, nicotine, parathion, mazidox, dimefox, demeton and endrin as spring washes and tar oil as a winter wash.

0·05 per cent. BHC, either as a dispersible powder or miscible preparation, gave by far the best results and virtually eliminated the pest. The Darley Dale 1955 experiment suggests that it is equally effective when applied in early or mid-April, but slightly less so when used at the end of that month. This gives a fair degree of latitude as far as time of application is concerned. Apart from the preliminary Woking experiment, the insecticide has only been used for one year, so that the results must be considered tentative, although it is interesting to note that the results from two such widely differing nurseries are very similar.

A single late application of 0·05 per cent. endrin was not as effective as the corresponding BHC spray and its toxicity hazard is greater.

Although the tar oil winter wash was fairly effective, it can only be used during suitable weather conditions which seldom occur at Darley Dale. At Woking, where conditions are more favourable for winter spraying, much planting is being done at this time of year and labour is therefore not available.

Spring applications of nicotine at Woking failed to give adequate control.

The organo-phosphorus compounds parathion, mazidox, dimefox and demeton gave disappointing results and their extremely poisonous nature precludes their use on a wide scale.

No phytotoxic effects were observed with any of the substances used.

ACKNOWLEDGMENTS

Our thanks are due to the Director of the R.H.S. Gardens, Wisley, and to DR. M. COHEN for their interest and encouragement; to MR. J. P.

DONCASTER, of the British Museum (Natural History), for confirming identifications of the insects; to MISS J. MAYNARD, at Wisley, and MR. P. F. ROBERTS, at Shardlow, for assistance in gall counting and spraying. The photographs were kindly provided by the Shell Photographic Unit. Finally, our grateful thanks to the two growers on whose holdings the experiments were conducted.

REFERENCES

(1) BÖRNER, C. (1908a). *Zool. Anz.*, **32**, 413–28.
(2) —— (1908b). *Zool. Anz.*, **33**, 612–16.
(3) BURDON, E. R. (1908a). *J. econ. Biol.*, **2**, 1–13, 63–7.
(4) —— (1908b). *J. econ. Biol.*, **2**, 119–48.
(5) CHOLODKOVSKY, N. A. (1894). *Zool. Anz.*, **17**, 434–7.
(6) —— (1896b). *Zool. Anz.*, **19**, 313.
(7) —— (1901). *Zool. Anz.*, **24**, 295–6.
(8) CLUSIUS, C. A. (1583). *Rariorum aliquot stirpium per Pannoniam Austriam, et vicinas quasdam Provincias observatorium historia*, p. 21. Antverpiae.
(9) DREYFUS, L. (1889d). *Biol. Cbl.*, **9**, 363–76.
(10) FELT, E. P. and BROMLEY, S. W. (1931). *J. econ. Ent.*, **24**, 161.
(11) FRIEND, R. B. (1927). *26th Rep. Conn. Ent.*, 223–8.
(12) GAMBRELL, F. L. (1934). *Tech. Bull. N.Y. agric. Exp. Sta.*, **225**, 55 pp.
(13) —— (1942). *Tech. Bull. N.Y. agric. Exp. Sta.*, **698**, 22–5.
(14) HERRICK, G. W. (1931). *Bull. Cornell agric. Exp. Sta.*, **515**, 21–2.
(15) —— and TANAKA, T. (1926). *Bull. Cornell agric. Exp. Sta.*, **454**, 17 pp.
(16) LINNÉ, C. VON (1746). *Fauna Suecica*, **699**, **700**, 215. Stockholm.
(17) PARROT, P. J., HARTZELL, F. Z., GLASGOW, H., and HARMAN, S. W. (1931). *J. econ. Ent.*, **24**, 300.
(18) PATCH, E. M. (1909). *Bull. agric. Exp. Sta.*, **173**, 290–4.
(19) SCHNEIDER-ORELLI, O., ROOS, K., and WEISMANN, R. (1938). *Vjschr. naturf. Ges. Zurich*, **83**, 29–107.
(20) STEVEN, H. M. (1916). *Proc. roy. Soc. Edin.*, **37**, 356–81.

NOTES FROM FELLOWS

Despoliation of Daphne

FOR the first five years, in S.W. Essex, our daphne (*D. mezereum* L.) bore its beautiful crop of scarlet fruits successfully; each fruit with a succulent outer layer for birds to eat, to secure dispersal, and with an inner stony layer to protect the seed. But these last two years it is bare. A pair of greenfinches (*Chloris chloris* L.), which are not otherwise seen in the garden, has discovered the bush, and in May and June they chew through the not yet hardened stone to devour the nutty seed.

This represents a catastrophe in the plant's life-cycle of a most unusual kind. Here is a plant which has evolved a special relationship with birds—the birds to be nourished by the outer part of the fruit and the seed to be dispersed—being robbed by birds who come and eat the seed before the stage is properly set. I should be grateful to hear of instances of the same or similar phenomena.

Those interested in the origin of the name *Daphne* in classical mythology, by the way, will find a further interpretation in *The Greek Myths*, vol. 1, pp. 76–82 (Penguin, 1955), by Robert Graves.

9, Mellows Road, Ilford, Essex. DR. MAX PETTERSSON

DWARF STRINGLESS FRENCH BEANS

F. G. Potter

(*A member of the Fruit and Vegetable Committee*)

A REFERENCE to old vegetable seed catalogues would show that stringless types of dwarf French beans such as they were, were known and, indeed, grown by a few vegetable connoisseurs a hundred years ago. Unfortunately, in spite of many endeavours to popularize these types in this country, the efforts of the experts have not been successful until quite recently. Thanks to the plant breeder, many improvements have been made which have again brought this type of bean into prominence.

The Council of the R.H.S. decided to conduct a trial of dwarf stringless French beans at Wisley during 1955 to examine the modern strains. Anyone who visited Wisley last summer and had the opportunity of seeing this trial will agree that dwarf stringless French beans should have a place in all vegetable gardens if only as a form of insurance against hot, dry weather. No doubt the summer of 1955 has proved that this type of bean stands hot, dry conditions better than the ordinary string kinds.

I have often heard it said by professional people that all dwarf beans are stringless if gathered for the table in a young state, but a season such as we have just experienced proves that this is only partially correct. These modern types of dwarf stringless French beans, in spite of the drought, have shown up to great advantage and when the pods were fully matured they readily snapped into two parts with no sign of stringing, whereas in a hot, dry season the life of the ordinary dwarf bean is very short and the pods quickly become stringy.

It has been my experience for some years that English people who have lived in tropical and sub-tropical countries have already discovered the value of these stringless beans. It can be readily understood, therefore, why these people should demand stringless types of bean on their return to this country for use in their own gardens.

In this short article I will not attempt to describe the numerous varieties sent for trial at Wisley but those which have received awards are referred to in the report of the trial, see page 38. No doubt some of these varieties will be obtainable from British Seedhouses this year.

Characteristics of these dwarf stringless French beans to which I should like to draw your attention are weight of crop, length of pod, and the most important character of continuous bearing habit which gives a longer season of production. The two main types are the green round pod and the golden wax flat pod. I therefore suggest and recommend that all members of this Society who hitherto have not had an opportunity of growing or seeing these dwarf stringless beans should give them a trial in their own gardens in 1956, as I feel sure they will be of extreme interest and a valuable addition to the vegetable garden.

WISLEY TRIALS 1955

DWARF STRINGLESS FRENCH BEANS

Thirty-nine stocks of dwarf stringless French beans were received at Wisley for trial in 1955. The trial was sown on May 9, 1955, in drills 1½ inches deep and 2 feet apart; the individual beans were spaced 4½ inches apart in the drills. To control bean seed fly, the drills were treated before sowing with 1½ per cent. Aldrin dust at the rate of 1 ounce per 10 yard run of drill. After germination the seedlings were thinned to 9 inches apart.

The trial was inspected by a sub-committee of the Fruit & Vegetable Committee on July 28 and August 3, 1955, and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description of the stock was that under which it was grown in the trial.

Green Podded

BLACK VALENTINE STRINGLESS. (Raised and sent by Messrs. Rasharasha Estate Ltd., Arusha, Tanganyika.) **A.M.** August 3, 1955. Plant 12 inches high, erect, much branched, light green foliage; flowers very light mauve; pods 6 inches long, ⅜ inch wide, straight but concave near point, oval, very freely produced in large loose clusters, five pods to a cluster; point from back of pod, $\frac{3}{10}$ inch long; ripe seed black. [12]

DELIKAT. (Raised by the Weibullsholm Plant Breeding Institute, introduced and sent by Messrs. W. Weibull A.B., Landskrona, Sweden.) **H.C.** August 3, 1955. Plant 13 inches high, erect, much branched, medium green foliage; flowers white; pods 4¼ inches long, $\frac{3}{10}$ inch wide, straight, round, freely produced in compact clusters, four pods to a cluster; point from back of pod, $\frac{3}{10}$ inch long; ripe seed chocolate brown. [31]

FAVORIT. (Raised and sent by Messrs. Rasharasha Estate Ltd.) **H.C.** August 3, 1955. Plant 12 inches high, erect, much branched, light green foliage; flowers white; pods 5 inches long, ⅜ inch wide, straight, oval to round, freely produced in large compact clusters, seven pods to a cluster; point from back of pod, ½ inch long; ripe seed buff pink. [14]

OHLSENIA. (Raised by Mr. N. A. Persson, introduced and sent by Messrs. J. E. Ohlsens Enke, Copenhagen, Denmark.) **H.C.** August 3, 1955. Plant 18 inches high, erect, much branched, medium dark green foliage; flowers light mauve; pods 5½ inches long, ⅜ inch wide, straight, round, freely produced in compact clusters, five pods to a cluster; point from back of pod, ⅜ inch long; ripe seed black. [28]

PHENIX CLAUDIA. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-Sur-Orge, (S. et O.), France.) **H.C.** August 3, 1955. Plant 14 inches high, erect, much branched, medium green foliage; flowers white; pods 6 inches long, ⅜ inch wide, straight, round, freely produced in loose clusters, five pods to a cluster; point from back of pod, ½ inch long; ripe seed purple. [23]

PROCESSOR. (Raised, introduced and sent by Messrs. Ferry Morse Seed Co., Mountain View, California, U.S.A.) **H.C.** August 3, 1955. Plant 14 inches high, erect, much branched, medium green foliage; flowers white; pods 4½ inches long, $\frac{3}{10}$ inch wide, straight but concave near point, oval, freely produced in compact clusters, six pods to a cluster; point from back of pod, ⅜ inch long; ripe seed white. [1]

TENDERBEST. (Raised, introduced and sent by Messrs. Ferry Morse Seed Co.) **H.C.** August 3, 1955. Plant 8 inches high, erect, much branched, light green foliage; flowers light mauve; pods 6 inches long, $\frac{3}{16}$ inch wide, straight, oval, very freely produced in compact clusters, ten pods to a cluster; point from back of pod, $\frac{3}{8}$ inch long; ripe seed black flecked with buff yellow. [9]

TOPCROP. (Raised and sent by Messrs. Rasharasha Estate Ltd.) **H.C.** August 3, 1955. Plant 16 inches high, erect, much branched, medium green foliage; flowers white; pods 5½ inches long, $\frac{3}{8}$ inch wide, straight, oval, freely produced in compact clusters, seven pods to a cluster; point from back of pod, $\frac{3}{8}$ inch long; ripe seed dark brown spotted light brown. [16]

VIRGO. (Raised by Mr. N. A. Persson, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** August 3, 1955. Plant 17 inches high, erect, much branched, dark green foliage; flowers white; pods 5 inches long, $\frac{3}{8}$ inch wide, straight, oval, freely produced in compact clusters, six pods to a cluster; point from back of pod, $\frac{1}{8}$ inch long; ripe seed khaki yellow. [27]

Golden Podded

SURECROP BLACK WAX. (Raised, introduced and sent by Messrs. Rasharasha Estate Ltd.) **A.M.** August 3, 1955. Plant 15 inches high, erect, much branched, medium green foliage; flowers light mauve; pods 6 inches long, ½ inch wide, straight, oval, freely produced in compact clusters, six pods to a cluster; point from back of pod, $\frac{3}{8}$ inch long; ripe seed black. [38]

TOPNOTCH GOLDEN WAX. (Raised, introduced and sent by Messrs. Rasharasha Estate Ltd.) **H.C.** August 3, 1955. Plant 15 inches high, erect, much branched, light green foliage; flowers white; pods 4½ inches long, $\frac{3}{8}$ inch wide, straight, flat, freely produced in compact clusters, five pods to a cluster; point from back of pod, ½ inch long; ripe seed white slightly blotched with brown. [35]

DELPHINIUMS

The trial of delphiniums was inspected by the Joint Delphinium Committee of the Royal Horticultural Society and the British Delphinium Society on July 1 and 11, 1955 and on its recommendation the Royal Horticultural Society and the British Delphinium Society have made the following awards to delphiniums as varieties for garden decoration.

The number in brackets after the description of the variety was that under which it was grown in the trial.

ANONA. (Raised, introduced and sent by Messrs. Blackmore & Langdon, Twerton Hill Nursery, Bath.) **A.M.** July 11, 1955.—An Elatum variety. Plant 7 feet tall; flower spike 3¼ feet long, blunt, flowers well spaced, many strong side spikes; flower 3½ inches diameter, on long stalk; sepals Butterfly Blue (H.C.C. 645/1), lightly flushed Mauve (H.C.C. 633/2); eye white with creamy-yellow hairs. [29]

CHARON. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **A.M.** July 11, 1955.—An Elatum variety. Plant 6½ feet tall; flower spike 3¼ feet long, tapering, flowers fairly close together, many strong side spikes; flowers 2¾ inches diameter, on medium length stalk; sepals Cobalt Blue (H.C.C. between 44/1 and 44); eye dark brown with yellow hairs. [83]

DAILY EXPRESS. (Raised, introduced and sent by R. C. Parrett Esq., Yew Cottage, Fairmile Lane, Cobham, Surrey.) **A.M.** July 1, 1955.—An Elatum variety. Plant 7 feet tall; flower spike 3 feet long, tapering, flowers fairly close together, many strong side spikes; flower 3 inches diameter, on long stalk; sepals a clear bright blue near Butterfly Blue (H.C.C. between 645/1 and 645) with a slight flush of mauve; eye brownish-grey with yellow hairs. [38]

GUY LANGDON. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **A.M.** July 1, 1955.—An Elatum variety. Plant 7 feet tall; flower spike 4 feet long, blunt to slightly tapering, flowers fairly close together, many strong side spikes; flower 3½ inches diameter, on long stalk; inner sepals Spectrum Violet (H.C.C. 735) at edges, fading towards centre to Spectrum Violet (H.C.C. 735/3), outer sepals Spectrum Violet (H.C.C. 735), touched Spectrum Blue (H.C.C. 45); eye purple margined with white. [72]

SILVER MOON. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **A.M.** July 11, 1955.—An Elatum variety. Plant 6½ feet tall; flower spike 2½ feet long, blunt, flowers fairly close together, many strong side spikes; flower 2¾ inches diameter, on long stalk; inner sepals Heliotrope (H.C.C. 636/3), outer sepals Heliotrope (H.C.C. 636/3), overlaid Butterfly Blue (H.C.C. 645/1); eye white with yellow hairs. [87]

STARTLING. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **A.M.** July 11, 1955.—An Elatum variety. Plant 6½ feet tall; flower spike 2½ feet long, blunt to slightly tapering, flowers close together, many strong side spikes; flower 3 inches diameter, on long stalks; inner sepals Amethyst Violet (H.C.C. 35), outer sepals Amethyst Violet (H.C.C. 35) tipped with Gentian Blue (H.C.C. 42); eye white with yellow hairs. [81]

KINGSWOOD. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **H.C.** July 11, 1955.—An Elatum variety. Plant 7 feet tall; flower spike 3 feet long, tapering, flowers close together, many strong side spikes; flower 2¾ inches diameter, on long stalk; inner sepals Mineral Violet (H.C.C. 635/3), outer sepals Butterfly Blue (H.C.C. 645/1), slightly flushed Mineral Violet (H.C.C. 635/3); eye white with yellow hairs. [82]

MARION. (Raised, introduced and sent by Messrs. Blackmore & Langdon.) **H.C.** July 11, 1955.—An Elatum variety. Plant 6 feet tall; flower spike 2¼ feet long, blunt to slightly tapering, flowers close together, many strong side spikes; flower 2¾ inches diameter, on short stalks; sepals Cobalt Blue (H.C.C. between 44/1 and 44), slightly flushed at base with Heliotrope (H.C.C. 636/2); eye white with central stripe of purple and yellow hairs. [86]

ERIGERONS

Twenty-five stocks of erigeron were received at Wisley in the spring of 1954. The trial was planted on March 8, 1954.

The trial was inspected by a sub-committee of Floral Committee A on August 4, 1954 and July 11 and 19, 1955 and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

DIGNITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd., Bressingham, Diss, Norfolk.) **A.M.** July 11, 1955.—Plant 3 feet high, erect, bushy, compact, much branched; inflorescence

compact; flowers 2½ inches diameter, single, freely produced, Violet (H.C.C. 36/1). [10]

CHARITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 19, 1955.—Plant 3 feet high, erect, compact, much branched; inflorescence compact; flowers 2½ inches diameter, single, freely produced, Mauve (H.C.C. 63). [23]

FELICITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 19, 1955.—Plant 2½ feet high, erect, compact, much branched; inflorescence compact; flowers 2½ inches diameter, semi-double, freely produced, Phlox Purple (H.C.C. 632). [9]

FRIVOLITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 11, 1955.—Plant 3 feet high, erect, compact, much branched; inflorescence compact; flowers 3 inches diameter, semi-double, freely produced, Imperial Purple (H.C.C. between 33/2 and 33/1). [22]

PROSPERITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 11, 1955.—Plant 1 foot 10 inches high, erect, compact, much branched; inflorescence compact; flowers 2 inches diameter, semi-double, freely produced, Violet (H.C.C. between 36/3 and 36/2). [8]

SERENITY. (Raised by Mr. Alan Bloom, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 11, 1955.—Plant 3 feet high, erect, bushy, compact; inflorescence compact; flowers 2¾ inches diameter, semi-double, freely produced, Amethyst Violet (H.C.C. 35). [21]

WIRRAL BLUE. (Raised by Mr. C. McMullen, introduced and sent by Messrs. Bloom's Nurseries Ltd.) **H.C.** July 11, 1955.—Plant 2½ feet high, erect, bushy, compact; inflorescence compact; flowers 2½ inches diameter, semi-double, freely produced, Violet (H.C.C. between 36/3 and 36/2). [4]

LARKSPURS

Forty-eight stocks of larkspurs were received in 1954 for trial at Wisley. The seed was sown on September 10, 1954 in rows 18 inches apart. The seed germinated evenly and the resulting seedlings over-wintered very well. The seedlings were thinned to 6–8 inches apart in March 1955.

The trial was inspected by a sub-committee of Floral Committee A on June 27 and July 19, 1955 and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Hyacinth-flowered Section

DWARF DOUBLE MIXED. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-sur-Orge, (S. et O.), France.) **A.M.** June 27, 1955.—Plant 26 inches high, compact, erect; flowering spike 9 inches long, branched, slightly tapering; flower 1¾ inches diameter, double, colours include white, pale pink, pink, mauve, ice blue and purple. [1]

SOHAM PINKIE. (Raised, introduced and sent by Mr. J. W. Boyce, Station Rd., Soham, Ely, Cambridgeshire.) **A.M.** June 27, 1955.—Plant 6 feet high, compact, erect; flowering spike 20 inches long, branched, blunt; flower 1¾ inches diameter, double, Neyron Rose (H.C.C. 623/1). [13]

Stock-flowered Section

ROSY SCARLET IMPROVED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** July 19, 1955.—Plant 5½ feet high, compact, erect; flowering spike 15 inches long, branched, tapering; flower 1½ inches diameter, semi-double, Rose Madder (H.C.C. 23). [24]

Giant Imperial Section

BRILLIANT ROSE. (Raised, introduced and sent by Messrs. Bodger Seeds Ltd., El Monte, California, U.S.A.) **A.M.** July 19, 1955.—Plant 5 feet high, compact, erect; flowering spike 16 inches long, branched, tapering; flower 1¾ inches diameter, semi-double, Neyron Rose (H.C.C. 623). [18]

REGAL ROSE. (Raised, introduced and sent by Messrs. Bodger Seeds Ltd.) **A.M.** July 19, 1955.—Plant 6½ feet high, compact, erect; flowering spike 19 inches long, branched, tapering; flower 1½ inches diameter, semi-double, Phlox Pink (H.C.C. 625/1). [22]

ROSALIND. (Raised, introduced and sent by Messrs. Denholm Seed Co., 2342 Sawtelle Boulevard, Los Angeles 64, California, U.S.A.) **A.M.** July 19, 1955.—Plant 6 feet 5 inches high, compact, erect; flowering spike 20 inches long, branched, tapering; flower 1¾ inches diameter, semi-double, Rose Madder (H.C.C. between 23/3 and 23/2). [19]

WHITE SUPREME. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **A.M.** July 19, 1955.—Plant 5 feet 11 inches high, compact, erect; flowering spike 20 inches long, branched, tapering; flower 1½ inches diameter, semi-double, white. [13]

CARMINE KING. (Sent by Messrs. Watkins & Simpson Ltd.) **H.C.** July 19, 1955.—Plant 5 feet 8 inches high, compact, erect; flowering spike 15 inches long, branched, tapering; flower 1½ inches diameter, semi-double, Rose Madder (H.C.C. 23). [26]

CARMINE KING IMPROVED. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** July 19, 1955.—Plant 5 feet 7 inches high, compact, erect; flowering spike 16 inches long, branched, tapering; flower 1½ inches diameter, semi-double, Tyrian Rose (H.C.C. 24). [27]

DARK BLUE SUPREME. (Raised and sent by Messrs. Bodger Seeds Ltd., Messrs. Denholm Seed Co.) **H.C.** July 19, 1955.—Plant 7 feet 3 inches high, compact, erect; flowering spike 21 inches long, branched, tapering; flower 1½ inches diameter, semi-double, inner petals Spectrum Violet (H.C.C. 735/1), outer petals Victoria Violet (H.C.C. 738/1). [42]

LILAC SUPREME IMPROVED. (Raised, introduced and sent by Messrs. Harrison & Sons (Leicester) Ltd., St. James St., Leicester.) **H.C.** July 19, 1955.—Plant 5 feet 6 inches high, compact, erect, flowering spike 19 inches long, branched, tapering; flower 1½ inches diameter, semi-double, inner petals Mineral Violet (H.C.C. 635), outer petals Campanula Violet (H.C.C. 37/1). [32]

MISS CALIFORNIA. (Sent by Messrs. Watkins & Simpson Ltd.) **H.C.** July 19, 1955.—Plant 6 feet 9 inches high, compact, erect; flowering spike 15 inches long, branched, tapering; flower 1¾ inches diameter, semi-double, Phlox Pink (H.C.C. 625/2), two white rogues. [10]

PINK SUPREME. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** July 19, 1955.—Plant 6 feet high, compact, erect; flowering spike 15½ inches long, branched, tapering; flower 1⅝ inches diameter, semi-double, Phlox Pink (H.C.C. between 625/2 and 625/1). [16]

REGAL LILAC. (Raised, introduced and sent by Messrs. Bodger Seeds Ltd.) **H.C.** July 19, 1955.—Plant 6 feet high, compact, erect; flowering spike 20 inches long, branched, tapering; flower 1½ inches diameter, Mineral Violet (H.C.C. 635/1). [31]

ROSE SUPREME. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** July 19, 1955.—Plant 5 feet 2 inches high, compact, erect; flowering spike 14½ inches long, branched, tapering; flower 1 3/16 inches diameter, semi-double, Phlox Pink (H.C.C. 625/1). [23]

ROYAL VELVET. (Raised, introduced and sent by Messrs. William Macdonald Seed Co., Santa Maria, California, U.S.A.) **H.C.** July 19, 1955.—Plant 4 feet 11 inches high, compact, erect; flowering spike 12 inches long, branched, tapering; flower 1½ inches diameter, inner petals Spectrum Violet (H.C.C. 735), outer petals near Mineral Violet (H.C.C. 39). [45]

STEEPLECHASE SKY BLUE. (Raised, introduced and sent by Messrs. W. Atlee Burpee Co., Hunting Park Avenue, Philadelphia 32, U.S.A.) **H.C.** July 19, 1955.—Plant 6 feet 5 inches high, branched, tapering; flower 1½ inches diameter, semi-double, Sea Lavender Violet (H.C.C. 637/2) with greenish-white stripe down centre of petal. [35]

STEEPLECHASE WHITE. (Raised, introduced and sent by Messrs. W. Atlee Burpee Co.) **H.C.** July 19, 1955.—Plant 6 feet 6 inches high, compact, erect; flowering spikes 24 inches long, branched, tapering; flower 1½ inches diameter, semi-double, white. [7]

SUMMER-FLOWERING STOCKS

Ninety strains of summer-flowering stocks were received in 1954 for trial at Wisley. The seed was sown on April 2, 1954 in pans which were placed in a warm glasshouse until the seed had germinated. The seedlings were pricked out into boxes containing John Innes Potting Compost No. 1. The trial was planted in the open ground on May 18, 1954; 60 plants of each strain were planted and the spacing was 15 inches apart each way.

The trial was divided into two sections, branching and non-branching. The branching varieties grew into good plants but the non-branching or column varieties did not grow satisfactorily and were grown again in 1955. In 1955 the trial was sown on February 16 and planted in the open ground on April 15.

The trial was inspected by a sub-committee of Floral Committee A on July 19 and 26, 1954 and June 27 and July 11, 1955 and on its recommendation the Council of the Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Branching Section

AURORA. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke, Linnesgade 14, Copenhagen, Denmark.) **H.C.** July 26, 1954.—Plant 24 inches high, branching, erect; inflorescence centre spike 10 inches long, side spikes 3½ inches long, flowers well spaced; flower 2 inches diameter, 58 per cent. double, a pale shade of apricot near Apricot (H.C.C. 609/3). [20]

LILAC PERFECTION. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-sur-Orge, (S. et O.), France.) **H.C.** July 26, 1954.—Plant 22 inches high, branching, compact, erect; inflorescence centre spike

10 inches long, side spikes 4 inches long, flowers well spaced; flower 2 inches diameter, 58 per cent. double, Cobalt Violet (H.C.C. 634/1) with slight fading towards centre of flower. [10]

MONTE CARLO. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke.) **H.C.** July 19, 1954.—Plant 21 inches high, branching, compact, erect; inflorescence centre spike 10 inches long, side spikes 4 inches long, flowers well spaced; flower 2 inches diameter, 68 per cent. double, cream with centre a greenish cream near Naples Yellow (H.C.C. between 403/3 and 403/2). [18]

QUEEN OF THE BELGIANS. (Sent by Messrs. Watkins & Simpson Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **H.C.** July 26, 1954.—Plant 22 inches high, branching, compact, erect; inflorescence centre spike 11 inches long, side spikes 4 inches long, flowers well spaced; flower 2 inches diameter, 66 per cent. double, Heliotrope (H.C.C. 636/2). [11]

ROSE QUEEN. (Raised, introduced and sent by Messrs. A. Hansen, Kastrup, Amager, Denmark.) **H.C.** July 19, 1954.—Plant 14 inches high, branching, dwarf, compact, erect; inflorescence centre spike 7 inches long, side spikes 5 inches long, flowers well spaced; flower 1¾ inches diameter, 98 per cent. double obtained by selecting the light green plants in the seedling stage, Roseine Purple (H.C.C. 629/1). [49]

SANTA MARIA. (Raised, introduced and sent by Messrs. William Macdonald Seed Co., Santa Maria, California, U.S.A.) **H.C.** July 19, 1954.—Plant 24 inches high, branching, erect; inflorescence centre spike 10 inches long, side spikes 3 inches long, flowers closely spaced; flower 2 inches diameter, 60 per cent. double, pure white centre greenish cream. [34]

VICTORIA BOUQUET BLOOD RED. (Raised, introduced and sent by Messrs. Sluis and Groot, Enkhuizen, Holland.) **H.C.** July 26, 1954.—Plant 15 inches high, branching, dwarf, very compact, erect; inflorescence all spikes 4 inches long, flowers compactly spaced; flower 1½ inches diameter, 70 per cent. double, Ruby Red (H.C.C. 827/3). [8]

Non-branching Section

BALL SUPREME. (Raised, introduced and sent by Messrs. Denholm Seed Co., 2342 Sawtelle Boulevard, Los Angeles 64, California, U.S.A.) **A.M.** July 11, 1955.—Plant 30 inches high, non-branching, compact, erect; inflorescence 18 inches long, flowers well spaced; flower 2½ inches diameter, 58 per cent. double, Petunia Purple (H.C.C. 32/2) fading with age to Petunia Purple (H.C.C. 32/3), inner petals green at base. [73]

MALMAISON PINK IMPROVED. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **A.M.** July 11, 1955.—Plant 26 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers well spaced; flower 2¼ inches diameter, 57 per cent. double, Dawn Pink (H.C.C. 523/2) with inner petals slightly paler. [71]

WHITE GIANT. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **A.M.** June 27, 1955.—Plant 26 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers closely spaced; flower 2¼ inches diameter, 57 per cent. double, white. [60]

APRICOT SUPREME. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** June 27, 1955.—Plant 26 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers well spaced; flower 2¼ inches, 58 per cent. double, Begonia (H.C.C. 619/3), inner petals creamy pink. [70]

AVALANCHE. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** June 27, 1955.—Plant 26 inches high, non-branching, compact,

erect; inflorescence 14 inches long, flowers well spaced; flower 2¼ inches diameter, 55 per cent. double, white. [63]

AVALANCHE. (Sent by Messrs. Sluis and Groot.) **H.C.** July 11, 1955.—Plant 24 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers well spaced; flower 2 inches diameter, 52 per cent. double, white, one rogue. [64]

DIANA. (Raised by the Weibullsholm Plant Breeding Institute, introduced and sent by Messrs. W. Weibull, Landskrona, Sweden.) **H.C.** June 27, 1955.—Plant 18 inches high, non-branching, compact, erect; inflorescence 14 inches long, flowers well spaced; flowers 2¼ inches diameter, 52 per cent. double, opening Naples Yellow (H.C.C. 403/2), when mature Naples Yellow (H.C.C. 403/3). [67]

LILAC SPIRE. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** July 11, 1955.—Plant 26 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers well spaced; flower 2⅝ inches diameter, 52 per cent. double, Heliotrope (H.C.C. 636/2). [84]

YELLOW WONDER. (Raised, introduced and sent by Messrs. Denholm Seed Co.) **H.C.** June 27, 1955.—Plant 28 inches high, non-branching, compact, erect; inflorescence 12 inches long, flowers well spaced; flower 2 inches diameter, 63 per cent. double, opening Naples Yellow (H.C.C. 403/2), when mature Naples Yellow (H.C.C. 403/2). [63]

SWEET PEAS

Eighty-six stocks of sweet peas were received at Wisley in the autumn of 1954. These, with thirty-three control varieties, were sown in boxes on October 14, 1954. The resulting seedlings were potted into 3-inch pots on November 16 and the pots were placed in cold frames for the winter. The plants were gradually hardened off ready for planting out, which took place on April 1, 1955. The trial was divided into two sections: (*a*) 12 plants of each stock naturally grown on hazel sticks, and (*b*) 12 plants of each stock cordon-grown on bamboo canes. Section (*a*) was planted in Floral Trial Grounds and Section (*b*) on the Vegetable Trial Grounds. In the winter of 1954–55 both sites were double dug incorporating a generous dressing of farmyard manure and a base dressing of bonemeal was applied before planting at the rate of 2 ounces per square yard.

The Joint Sweet Pea Committee of the Royal Horticultural Society and the National Sweet Pea Society inspected the trial on July 5, 1955 and on its recommendation the following awards have been made jointly by the Royal Horticultural Society and the National Sweet Pea Society.

The measurements given are those taken from plants in the cordon-grown section. The letter and number in brackets after the description of the stock was that under which it was grown in the trial.

CASCADE. (Raised and sent by Messrs. T. Cullen & Sons, Witham, Essex.) **A.M.** July 5, 1955.—Plant vigorous; flower stem 15 inches long, stiff, an average of 5 flowers per stem. Flowers 2½ inches across, 1½ inches deep, large, well spaced, standards slightly reflexed and very waved, wings waved, opening pale creamy yellow turning when fully open to white. [D.5]

DAVID. (Raised and sent by Messrs. Ferry-Morse Seed Co., Mountain View, California, U.S.A.) **A.M.** July 5, 1955.—A Cuthbertson floribunda type. Plant very vigorous, very free flowering; flower stem 15 inches long, stiff, an average of 5 flowers per stem. Flowers 2¼ inches across, 2 inches

deep, large, well spaced, waved, Tyrian Purple (H.C.C. 727), base of wings and standards white. [E.2]

HENLEY. (Raised and sent by Messrs. Sutton & Sons Ltd., Reading, Berkshire.) **A.M.** July 5, 1955.—Plant vigorous; flower stem 15 inches long, stiff, an average of 4 flowers per stem. Flowers 2¼ inches across, 1⅜ inches deep, large, well spaced, waved, ground white flushed Mineral Violet (H.C.C. 635/2), inner margins of wings Mineral Violet (H.C.C. 635). [B.9]

KING'S RHAPSODY. (Raised and sent by Messrs. E. W. King & Co. Ltd., Coggeshall, Essex.) **A.M.** July 5, 1955.—Plant vigorous, flower stem 16 inches long, stiff, an average of 5 flowers per stem. Flowers 2¼ inches across, 1¾ inches deep, well spaced, standards very waved, Signal Red (H.C.C. 719/3). [E.6]

WINSTON CHURCHILL. (Raised and sent by Messrs. T. Cullen & Sons.) **A.M.** July 5, 1955.—Plant vigorous; flower stem 14 inches long, stiff, an average of 4 flowers per stem. Flowers 2¼ inches across, 1½ inches deep, well spaced, waved, deep red near Cardinal Red (H.C.C. 822/1). [E.9]

JUDY. (Raised and sent by Messrs. R. Bolton & Son, Birdbrook, Halstead, Essex.) **H.C.** July 5, 1955.—Plant vigorous; flower stem 16 inches long, stiff, an average of 4 flowers per stem. Flower 2¼ inches across, 1⅜ inches deep, well spaced, waved, ground cream splashed with Crimson (H.C.C. 22/1). [A.32]

PLEASURE. (Raised and sent by Mr. P. Simons, Lyndhurst Nurseries, Ardleigh, Colchester, Essex.) **H.C.** July 5, 1955.—Plant vigorous; flower stem 15 inches long, stiff, an average of 4 flowers per stem. Flower 2¼ inches across, 1⅜ inches deep, well spaced, waved, a shade of blue-purple near Imperial Purple (H.C.C. 33/1), colour deepens towards the centre of the flower. [B.4]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1955

Begonia 'Pink Perfection' A.M. October 18, 1955, as a greenhouse flowering plant. A very vigorous and attractive winter-flowering, hybrid with double Carmine Rose (H.C.C. 621/1) flowers measuring 2½ inches across when fully expanded. Shown by The Nottingham Corporation Parks Department, Nottingham.

Carnation 'Bailey's Superb' A.M. May 24, 1955 as a variety for exhibition and market. A perpetual-flowering variety with a flower about 4½ inches in diameter, carried on a robust stem. Free flowering, keeping colour well in all seasons. Colour Rose Pink (H.C.C. 427). Raised and exhibited by Mr. Steven Bailey, Eden Nursery, Sway, Hants.

Cobaea scandens A.M. October 4, 1955. A vigorous climbing plant for the cool greenhouse, which in favourable localities may be grown outside as a half-hardy annual. It has handsome grey-green, pinnate, tendrilled leaves with six ovate leaflets up to 4 inches long. The flowers develop singly in the leaf-axils, and each has a stiff pedicel up to 8 inches long. The flower has a persistent calyx of five large, ovate

lobes and a bell-shaped corolla over 2 inches long, opening green and passing to violet as it ages. Exhibited by The Director, University Botanic Garden, Cambridge.

Nerine 'Naomi' A.M. October 18, 1955, as an exhibition flower. A very beautiful variety resulting from a cross between N. 'Aerolite' and N. 'Lionel' with large Vermilion (H.C.C. 18/2) flowers having a darker central streak to the perianth segments. The plant exhibited carried an umbel of eight flowers. **P.C.** October 21, 1952. Raised and shown by Edmund de Rothschild, Esq. (gr., Mr. F. Wynniatt), Exbury, Nr. Southampton.

Nerine 'Nelson' F.C.C. October 18, 1955, as an exhibition flower. A fine Fuchsia purple variety with broad perianth segments having a central streak of Turkey red. It is the result of a cross between N. 'Aerolite' and N. 'Lionel.' An **A.M.** was given to it on October 21, 1952. Raised and shown by Edmund de Rothschild, Esq. (gr., Mr. F. Wynniatt), Exbury, Nr. Southampton.

Nerine 'Salmon Trout' A.M. October 18, 1955, as an exhibition flower. A very attractive variety with medium-sized Azalea Pink (H.C.C. 618) flowers having a slightly deeper central streak on the perianth segments. The plant exhibited carried an umbel of twelve flowers. Raised and shown by Edmund de Rothschild, Esq. (gr., Mr. F. Wynniatt), Exbury, Nr. Southampton.

Rosa webbiana A.M. October 4, 1955. A Himalayan species with slender, arching branches clothed with small leaves made up of five to nine broadly ovate leaflets and bearing pale pink flowers in clusters of two or three. The award is given for the fruit, which is flask-shaped, 1 inch long, coloured Dutch Vermilion (H.C.C. 717). Exhibited by Messrs. T. Hilling & Co., Ltd., Chobham, Woking.

Schima argentea A.M. October 4, 1955. An evergreen shrub or tree introduced by FORREST from Western China in 1919. It has leathery, ovate-lanceolate, long-pointed leaves 3 to 5 inches long, deep green above and pale grey-green beneath. The flowers, springing from the upper axils of the young shoots, resemble single white camellias about 2 inches across. This is an attractive and uncommon late-flowering plant, hardy in the more favoured localities. Exhibited by Lord Aberconway and the National Trust, Bodnant, N. Wales.

BOOK NOTES

"The Old Shrub Roses." By Graham Stuart Thomas. Demy 8vo. 224 pp Illus. (Phoenix House.) 32*s.* 6*d.*

The name of Graham Thomas is known to and respected by practically all gardeners who grow the old shrub roses. For many years he has made a special study of them and has done most valuable work in gathering together from many and varied sources a large collection from which Messrs. Hilling have propagated and placed on the market all the best. This second half of the work must be regarded as of as much importance and benefit to horticulturists as the first. Many of these old roses are first-class garden shrubs, and as such they should be considered and treated. Consequently

Mr. Thomas's book will be welcome wherever they are grown. He deals briefly with their history and their place in the garden, their cultivation and pruning, and the great rose gardens near Paris, before passing to chapters on the particular groups and descriptions of the roses within the groups which are in cultivation today. His directions are generally clear and concise, though in some cases one feels that his chapters could have been expanded with advantage. While, being also a nurseryman, he tells us little about propagation and, perhaps necessarily, advocates the budded rose in preference to that grown on its own roots from cuttings. He suggests, however, that the unions should be planted three inches below soil-level. Another interesting and rather unexpected observation is that the finest blooms come to him from gardens in the western and even northern half of the country, where there is generally greater rainfall and moisture and where the roses mature more slowly.

Mr. Thomas has taken considerable trouble to correlate his descriptions with the old plates, particularly those of Redouté, and it is of great interest to see how many he has managed to find there and often under other names—for instance 'Celeste' is featured under the name *Rosa damascena* 'Aurora,' but the plate is unmistakable. The Spinosissimas are the group with which he has dealt least and they are certainly not the least valuable to the gardener. Perhaps this may be rectified in a later work. There is an enthusiastic and most charming foreword by Miss V. Sackville-West and a long chapter by the late Dr. C. C. Hurst, reprinted from articles in our JOURNAL, dealing most authoritatively with the origin and evolution of many of these old roses. Some of the colour plates are disappointing and not up to the standard of the rest of the book, but the monochrome illustrations are much better and give a good idea of the growth of the roses they portray. It is welcome news to read on the last page that Mr. Thomas is hoping to write another volume covering all the other shrub roses.

D. BOWES-LYON

"Old Carnations and Pinks." By C. Oscar Moreton. 4to. xi + 51 pp. Illus. (George Rainbird in association with Collins.) £3 3*s*.

When this wonderful book was handed to me, I was filled with admiration for the author because of his great labour and care in gleaning all the information in the way he has done and grouping this in such a readable form; yet we must also congratulate the publishers, George Rainbird, Ltd., for their courage in producing so rich and splendid a work. Also the illustrations, especially the beautiful coloured plates of the ancestors of our present-day carnations and pinks by Rory McEwen, are more than good, they are a work of art. This is a unique and sumptuous work, quite fascinating for those who adore the ancestors of the divine-flower, which after all are the foundation stones upon which some of us have built.

Sacheverell Sitwell in his foreword writes with a good deal of feeling for the magnificent production of this book and in appreciation of its author, and of the beauty of the flowers when grown in their natural state. To me the history of any flower is interesting, but when this can be carried back almost to the dawn of civilization it is of more than common import.

It is interesting to note that we of the present day favour self-coloured carnations and pinks, but they of the Tudor and Stuart periods favoured multi-coloured Flakes and Bizarres, as well as overlaid colourings in the Picotees.

The infinite perfection in the colouring of the blooms and the appreciation of their details are only seen in individual flowers, but the Edwardians in their lavish day favoured self-coloured flowers, because they used them in masses. All this killed the appreciation for detail, yet up to the Victorian era florist's flowers were shown on boards at flower shows.

I am pleased to read in the book the appreciation given to the work of the seventeenth-century raisers, for too often the early work is overlooked and the work of the eighteenth century is over-appreciated. I am sure that our work is easier today than was theirs. We could go on romancing about 'Painted Lady,' 'Old Flame,' 'Old Man's Head,' etc., which should be more than memories, for our ancestors are indeed part of us today, for better or worse.

MONTAGU C. ALLWOOD

"Fruits and Flowers," By Pierre Joseph Redouté. Edited by Eva Mannering. 24 coloured plates. (The Ariel Press.) General edition 30*s*. Full linen bound edition 45*s*.

The Ariel Press, whose volume on the Roses of Redouté appeared last year, has now done another service to flower-lovers by publishing a selection of twenty-four

plates from his *Choix des Plus Belles Fleurs et des Plus Beaux Fruits*. The reproduction is good, and the book, though more expensive than its predecessor, is still excellent value. By way of text there are a short introduction by Mrs. Eva Mannering, a translation of Redouté's own Preface and some rather inadequate notes on the plants figured.

We are informed that Redouté's book, "as the title indicates, contains all those colour plates which the master himself considered his most beautiful ones." But the title says no such thing. The book was, in fact, primarily a catch-penny attempt by the artist to make some urgently needed money, by publishing a popular book of prints of well-loved flowers and fruits. Some of the plates, beautiful though they are, are actually *curtailed* versions of the prints that had already appeared in *Les Liliacées* and other works of his.

The quotation from Goethe, "The sight of these pages enchants us . . ." at the head of the Introduction does not, as the reader might perhaps imagine, refer to Redouté, but to Ferdinand Bauer—a yet greater botanical artist than Redouté and one who has not yet received full recognition. Perhaps the Ariel Press will now have the courage to give us a volume of plates by one of the several contemporaries of Redouté who were his equal or superior but whose popularity is not yet established. Redouté is a great flower-painter, but it is high time that the public was persuaded that he is not the only one.

WILFRID BLUNT

"The Genus Nicotiana," Vol. 16, Chronica Botanica. By T. H. Goodspeed. xxii + 536 pp. Illus. (Waltham, Mass., The Chronica Botanica Co.; London: Wm. Dawson & Sons Ltd.) $12.50.

The tobaccos are of importance to British horticulturists as providing a number of attractive and sweetly perfumed flowering plants that are easily grown in our gardens. The genus consists, on the classification presented in the book here under notice, of sixty species. In geographical range, as native plants, these are restricted to North and South America and Australasia. In recent years the genus has received much attention from cytologists and geneticists and many papers on it have been published in numerous scientific journals. Amongst those who have been engaged in active research on the cytogenetics and taxonomy of *Nicotiana*, Professor Goodspeed has been outstanding. It is of great value to all who are interested in modern botanical research to have published in book form the factual evidence obtained and the detailed conclusions reached by such a specialist. Probably most horticulturists will consider this work outside the scope of gardening. Nevertheless, it will have to be consulted by those who wish accurately to determine species within the genus and it contains a wealth of information regarding the probable course of evolution of a group familiar to most gardeners.

The considerable role played by hybridization, whether or not this was followed by doubling of the chromosomes, is emphasized. That mutation has been of fundamental importance in giving initial variation is accepted but it is difficult to determine its occurrence at any given taxonomic level. While 6 is postulated as the original basic chromosome number for the genus *Nicotiana* (and probably for its family, the *Solanaceae*) ploidy of one kind or another has led to 12-paired and 24-paired series of species and other karyological modifications. It is of considerable interest to those modern taxonomists who consider that in the future plant classification must include more than data from gross morphology, that Professor Goodspeed has incorporated so much detailed research on living material, on phytogeography, and on cytogenetics in a clear system of classification without the introduction of new taxonomic categories or a new terminology.

W. B. TURRILL

"The Woman Gardener." By Frances Perry. 8vo. 384 pp. 150 illus. (Published by Hulton Press, 1955.) 18*s*.

Frances Perry is well known for her excellent books on "Water Gardening" and "The Herbaceous Border," but her frequent appearances on radio and television have brought her into contact with a much wider circle and one, moreover, which does not hesitate to get in touch with her and ask questions. She is, therefore, in an excellent position to know the sort of information that amateur gardeners want. She reports that by far the greater number of enquiries come from women, and hence the new book is addressed to "The Woman Gardener"; there are certainly a few sections which will appeal more to women—the uses of herbs, flower arrangement and, possibly, house plants—but the greater part of the book will be just as useful to men who are

beginning to take an interest in their garden and want guidance. All phases of gardening are covered, from the laying-out, preparing of the ground, planting and after-care of useful and ornamental plants of all kinds; the many illustrations are good and very helpful. Moreover, it is a very readable book; the directions are not didactic; the reason for each operation is given, which makes the information much easier to remember and to understand. This is a really noteworthy book, a very valuable contribution to the literature of gardening.

VERA HIGGINS

"Common Succulents." By H. Hall. Sm. 8vo. 32 pp. Illus. (Published by Longmans, Green and Co., 1955.) 6*s*.

This book is one of a series on the fauna and flora of South Africa, intended for the information of residents there who are not specialists. The title, therefore, is somewhat misleading to readers in the British Isles, but the contents will be of great interest to anyone who grows these plants. The text is by Harry Hall, at one time Curator of the Darrah Collection, Manchester, and for some years now at Kirstenbosch, whose skill in the finding and growing of succulent plants is well known in this country; the four colour plates are by Mrs. E. Garrett Rice, who illustrated *Wild Flowers of the Cape of Good Hope*, by Prof. R. H. Compton. All the important families in South Africa that include succulent species are surveyed and examples described in detail, together with the best methods of growing them. The knowledge of the behaviour of succulent plants in their native home cannot fail to be interesting and helpful to growers in this country.

VERA HIGGINS

"Your Gardening Book." By Cyril Cowell. 72 pp. Illus. (Faber & Faber Ltd.) 5*s*. 6*d*.

This is a good book on gardening for the young. It is simply and lucidly written, comprehensive in its coverage, and copiously illustrated with line drawings by the author. These show the know-how of numerous gardening operations and enable the identification of the commoner garden ground pests and weeds. The chapters on the fertilization of the soil and propagation are particularly good. In fact, it is surprising how adequate a coverage of a variety of subjects has been possible in a short book. Many adult novices could do far worse than to study this book as an introduction to gardening.

LANNING ROPER

"Better Roses." By A. S. Thomas. 306 pp. 2nd edition. Illus. in colour and half tone. (Angus & Robertson.) 30*s*.

When the first edition of *Better Roses*, by Dr. A. S. Thomas, was published in 1950 it was welcomed as a thoroughly comprehensive book on the subject, and a new edition now appears, completely revised and brought up to date in the light of another five years' experience. Written mainly with a view to conditions in Australia and New Zealand, it is, nevertheless, of interest to gardeners in all countries and climates. The history of the rose from earliest times is to some extent theoretical, but in practical cultivation the book deals in a most authoritative manner with all the problems on which a rose grower may seek advice. As a scientist as well as a keen amateur his survey of the chemical and physical requirements of the rose, written from personal experience, is without doubt one of the most extensive and reliable of any that I have known. One reads with envy of the luxuriant growth and wealth of flowers that is usual under Australian conditions; 'Dame Edith Helen' grows to about 6 feet with any quantity of exhibition blooms, but in England it is decadent and worthwhile plants are rarely seen. I have budded the Australian strain here but the maiden plants do not seem as yet to be much improvement on those which I discarded years ago from my own garden; it will be interesting to see whether it is the strain or the climate which produces such fine results with this and some other varieties in Australia. Dr. Thomas is an enthusiast for the hybrid tea type and the "exhibition" rose, but in Great Britain and northern Europe this is severely challenged by the floribunda type, which is so much hardier and more decorative here for garden purposes. I can highly recommend this interesting and knowledgeable book to all rose lovers.

BERTRAM PARK

"Climbing Roses." By Helen Van Pelt Wilson. 212 pp. Illus. (M. Barrows & Co. Inc.) $3.95.

There is no doubt that books beget books, and having suffered from a surfeit of books on roses as a whole we now may look forward to books on specialized aspects of

roses and rose culture. Who would have thought that a book of 200 pages on climbing roses would have been necessary today? And yet, having read it, I realize that we have in Mrs. Van Pelt Wilson's book a fully justified exposition of the climbing and rambling roses, their appreciation and culture. There is not a dull or superfluous line in the book and every possible contingency from the amateur's point of view is thoroughly covered in an interesting and absorbing way, with many pithy and amusing interpolations. Mrs. Wilson is not an author with just a lot to say; she has considered opinions and valuable thoughts to give, and a charming way of giving them. Three things in particular struck me; one was her full appreciation of the beginner's point of view, with the most careful laying of all bogeys and attendant instructions on all relevant matters of cultivation and display; another—rare in a specialist—her grasp of the fact that one's favourite flower needs chosen foils and complementary colour and form in display; and lastly, this is the finest example I have read of a modern rose-specialist's appreciation of the wide-spread riches offered by the rose. Even ground coverers, a sadly neglected group, receive due consideration.

It is the more surprising, therefore, to find entirely omitted that superb group of rambling roses headed by 'Alberic Barbier' and 'François Juranville' (one might call them the French Wichuraiana hybrids). *Rosa setigera* and the double yellow *Banksia* are described as scentless, though I have not found this so.

The book is well printed and produced, and lavishly illustrated, including some plates in colour, and although written for gardeners in the U.S.A., has much to recommend it to those who wish to cultivate and appreciate climbing roses anywhere in the world. And who wouldn't after reading her book?

G. S. THOMAS

"The Botany of Cook's Voyages and its unexpected significance in relation to Anthropology, Biogeography and History." By E. D. Merrill. Chronica Botanica, Vol. 14, Nos. 5 & 6. Pp. i–iv, 161–384, plates 80–93. (1954.)

What a happy coincidence that Tahiti, the very centre of Polynesian culture, was the first of those islands to be botanized, for in the year 1769 Banks and Solander, who shipped with H.M.S. *Endeavour*, captained by James Cook, visited the island. This was only two years after the island's discovery by Wallis and here anthropologists have been fortunate in the exhibit of the virgin habitat that flowered before them. Into this Eden wilful domesticates and weeds rapidly encroached, however. Three years later a German naturalist, Forster, and his son shipped with Cook's second voyage, 1772–5. The few specimens preserved from the third voyage are insufficient for use in this critique. Merrill believes very few if any lowland species were missed in the total of five and a half months spent in Tahiti on the first two expeditions. The thesis of Merrill's book is that "it would be foolish to assert that there were no communications across the Pacific in pre-Magellan times, but there is no dependable biological evidence that there was any effective direct communication across the great ocean until after Magellan's pioneer voyage in 1521." Merrill proceeds to the factors which must be considered in accounting for the rapid spread of American species found there from what have been judged to be aboriginal times. "One reason why aggressive American weeds of tropical origin, once introduced and established in the Old World, develop 'Napoleonic ambitions' is that they were introduced without the insect, fungus and other enemies that kept them, more or less, in check in those parts of America whence they came." The story of Tahiti is the very centre of Merrill's debate. And a right lively debate it is! Tahiti holds the key to an understanding of what plants were outrigged from island to island and their presence (or absence!) on any given island in Polynesia. From a fresh examination of the Banks and Solander collections, the on-the-spot Parkinson drawings and the Solander descriptions written often from fresh material, all preserved in the British Museum (Natural History), Merrill has argued forcefully (if somewhat redundantly) against the arguments of "certain authorities": Carter, Heyerdahl, Sauer, Bakhuizen, and Edgar Anderson, that Polynesian domesticates with the single exception of the sweet potato came not from America but out of Asia via Malaysia. In fact, the first seven chapters of Merrill's book are an extended rebuttal principally to two books which one should read—and they are both engagingly written, too—Sauer's *Agricultural Origins and Dispersal* (1952) and Anderson's *Plants, Man, and Life* (1952). Merrill's rebuttal is a thick brew, savoury with thought-provoking morsels. His book was written over a period of several years, however, with interruptions, resulting in annoying repetitions. Merrill deplores them; some usefully emphasize essential arguments. In his recent *Index Rafinesquianus*, a bibliography of Rafinesque's plant names with valuable introductory chapters on principles of publication, the idiosyncrasies of authors and the like, Merrill wrote spiritedly. The final

chapters of Cook's voyages, wherein he considers the problematical names published vicariously by Parkinson, again contain many titbits of interest to the historian of botany. But for a good story may I suggest sampling Chapter One or Five : here's a *raconteur* among botanists.

JOSEPH EWAN

"Cacti and Other Succulents." By Edgar Lamb. 311 pp. Illus. (Blandford Press.) 45*s*.

Mr. Lamb has made an outstanding contribution to the ever-growing interest in cacti and succulent plants. He has given us for the first time a simple, interesting and also an accurate pictorial reference book—of value both to the expert and to the amateur. It is not comprehensive, but how could he make it both saleable and readable if he tried to cover the 6,000 members of the succulent family ?

Mr. Lamb is an ideal person to write this book, for he is a great technical expert on his subject and a real lover of his plants. He has a fine collection, which he treats more as a hobby than a commercial proposition; and now we have the good fortune in one volume to possess some two hundred and fifty photographs including thirty-two coloured plates of this wonderful collection—each one with descriptive and cultural notes based on Mr. Lamb's own long and wide experience. He has included an outline summary at the head of each group, whilst at the end he gives us a list of the other members of the group, not yet included in his book. Let us hope that in the not-too-far-distant future he will include these plants in a second volume. I say this in the very genuine belief that most of us find it easier to recognize the finer points of differentiation between the various members of each group if we are guided by one of Mr. Lamb's very clear photographs.

OLIVER LEESE

"The Observer's Book of Common Fungi." By E. M. Wakefield, O.B.E. 118 pp. Illus. with 64 photographs and 32 colour plates. (Frederick Warne & Co.) 5*s*.

This extremely useful volume is designed to slip into the pocket of the reader while strolling through the country. It contains descriptions of 200 species of fungi with a useful key to the families and genera which readily enables even the inexperienced to find their way about. Of particular assistance are the numerous photographs and line drawings to illustrate the distinguishing features, together with 32 colour plates showing the fungi together with cross sections. In the introduction the author covers clearly but briefly the basic principles of structure, germination and growth with well-chosen comments for the fungus gourmet, who is wisely advised to learn to identify the poisonous species, only about six in Great Britain, and to beware of all the supposedly "sure" tests.

LANNING ROPER

The following books have been received:

"Studies of North-West American Forests in relation to Silviculture in Great Britain." Forestry Commission Bulletin No. 25. By R. F. Wood. 42 pp. Illus. (H.M.S.O.) 6*s*.

"Journal of Experimental Botany." Volume 6, No. 17. 311 pp. (Oxford: At the Clarendon Press. London: Geoffrey Cumberlege.) 22*s*.

"Collection and storage of Ash, Sycamore and Maple seed." Forestry Commission Leaflet No. 33. 9 pp. (H.M.S.O.) 6*d*.

"Agreements on Afforestation in the Lake District." Reports by the Joint Informal Committee of the Forestry Commission and the Council for the Preservation of Rural England. 10 pp. (H.M.S.O.) 6*d*.

"Badgers in Woodlands." Leaflet No. 34. Forestry Commission. 11 pp. Illus. (H.M.S.O.) 9*d*.

ORDERS FOR BOOKS

The Society does not sell any publications other than its own. Orders for books reviewed should therefore be sent direct to the bookseller and not to the offices of the Society.

The contents of this volume are copyright. For permission to reproduce any of the articles application should be made to the Council.

Carters Tested Seeds

Our New Season's Catalogue contains a very wide selection of Choice Flower and Vegetable Seeds, including our very Latest Novelties and introductions.

FLOWER, VEGETABLE, and LAWN GRASS SEEDS

The "Blue Book of Gardening" Catalogue

Free on Request

Carters TESTED SEEDS LTD

RAYNES PARK, LONDON S.W.20

RICHARDSON

TIMBER and ALUMINIUM

GREENHOUSES

STOCK MODELS
or any special designs

★

Richardson Greenhouses supplied for Royal Horticultural Society's gardens at Wisley

★

WOOD LATH AND OTHER GREENHOUSE BLINDS SUPPLIED TO ORDER

Complete Maintenance Service
(available any district)

Boilers supplied. Heating systems overhauled, repaired, remodelled. General repairs, painting, glazing, etc.

Estimates free

W. RICHARDSON

& CO. LIMITED

NEASHAM RD., DARLINGTON

London Office: 117 Victoria Street, S.W.1

Associated Firms:
J. Weeks & Co. (Chelsea). James Gray (Chelsea). Simpson & Farmer (Glasgow).

HORTICULTURAL and HEATING ENGINEERS. **Established 80 years**

STRAWSON

Quality Greenhouses

"A Personal Service"

Since our firm was founded in 1892, we have endeavoured to set a standard in Greenhouse building "second to none." There are no limitations to the Strawson range which can be supplied anywhere in any size or type.

Enquiries should be addressed to Mr. R. F. Strawson, who will *personally* send estimates and full particulars of the famous Strawson range of Greenhouses, Frames, Greenhouse Heating, and other valuable information.

Mr. Strawson can also arrange personal Surveys of Inspection in any part of the country at short notice.

G. F. STRAWSON & SON
HORLEY, SURREY. Tel: Horley 130

GRASSPHALTE LTD

SOUTH BANK PROMENADE
For The London County Council

For over 30 years the Surface for Service!

BAFSC

YOU CAN DO A GOOD DEAL BETTER WITH GRASSPHALTE

HAMPTON HILL, MIDDLESEX. *Molesey 4343/4*

THE "PLUIE" GARDEN FRAME

THE PERFECT FRAME

Tops pull down to the sides for easy access. Free from clips, loose screws or bolts. Heavy steel, cold galvanised.

PLUIE MAJOR

Size 4 ft. 9 ins. long, 4 ft. wide, 20 ins. high centre. Price complete £9·0·0. Carriage 10/-

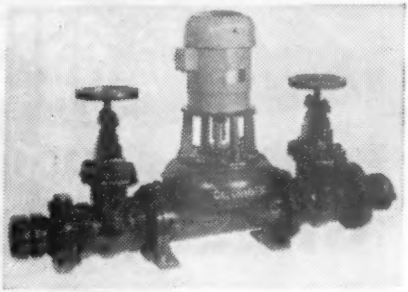
PLUIE MINOR

Size 41 ins. long; 38 ins. wide, 15½ ins. high centre. ***Ideal for propagating. Soil warmer can be used.*** Price complete **£5·15·0.** Carriage 5/-

POULTMURE LTD

Dept. H.S.
5 COLLEGE ROAD, HARROW, MIDDX

CIRCULATION BY
"CALORMATIC"



FOR INCREASED EFFICIENCY AND ECONOMY IN HEATING

A product of outstanding merit and performance, built on sound engineering principles and design, definitely ahead of any other on the market. ALL CALORMATIC PUMPS are fitted with totally-enclosed English Electric Motors as standard.

Please send for further details

HARRINGTONS (W'TON) LTD.
DAWLEY BROOK WORKS, KINGSWINFORD, STAFFS.
Phone: KINGSWINFORD 3301

Chase SEED-RAISERS

● **With glass-wick irrigation**

Chase Seed-Raisers are the complete answer for the keen gardener who has no heated greenhouse. Inexpensive, efficient and very economical to run, they are irrigated by glass-fibre wicks which always ensure correct humidity.

Chaselectric Model (*as illustrated*). 3 ft. long, 2 ft. wide, 1 ft. 6 in. high, with 12 seed boxes. For A.C. or D.C. Mains ... ... **£8 . 10 . 0**

Oil-heated Model. Approximately 2 ft. square and 2 ft. high with 9 seed boxes. Paraffin lamp burns 5 days without refilling ... ... **£5 . 17 . 6**

Window-sill Model. Ideal for producing indoors a small number of very special seedlings. Very economical to run, heated by 15 or 25 Watt bulb **£1 . 5 . 0**

Send for descriptive leaflet

Chase Protected Cultivation Ltd.
38 Cloche House • Shepperton • Middlesex

FROM
Abelia
to Zauschneria

* Over 2,000 different varieties of plants are offered in our latest comprehensive 116-page ILLUSTRATED GENERAL CATALOGUE.

CHOICE PLANTS for the Connoisseur

70 Money-saving collections for New Gardens this season. Order Toynbee's first-quality plants.

CONIFERS ROCK PLANTS
ORNAMENTAL TREES
FLOWERING SHRUBS
HARDY PERENNIALS FRUIT

Send for your copy TODAY —enclosing 1/- in stamps, which will be credited on first order.

TOYNBEE'S NURSERIES, BARNHAM, BOGNOR REGIS, SUSSEX

Laxton's THE FINEST NAME SINCE 1860

You can safely rely on LAXTON'S specially selected strains of the tested leading varieties. LAXTON'S are the Raisers with nearly 100 years' experience and over 250 awards—and LAXTON'S vegetable and flower seeds are known and grown everywhere. You are sure of quality and prompt attention whether you buy in small or large quantities, either from LAXTON'S advertised lists or from the LAXTON Seed Catalogue, which will be sent free to you on request.

FOR SEEDS

YOUR 1955/6 MANUAL
Write for your copy of Laxton's Seed Cultivation Manual and Catalogue.

LAXTON BROS. BEDFORD LTD.
63 High Street, Bedford

FRUIT TREE RAISERS
NURSERYMEN
& SEEDSMEN

The Labour-saving Machine for Spraying Fruit, Vegetables, etc.

The "**LEO-COLIBRI**" Pneumatic (Pressure Retaining) Sprayer

SPRAYING MACHINERY

for applying Washes, Dusts, Weedkillers, Creosote, Disinfectant and Limewash.

Catalogue from:

COOPER, PEGLER & CO. LTD
P.O. Box No. 9—67
BURGESS HILL, SUSSEX

NEW FLOWERS FOR 1956!

Here are some of the exciting flower seed novelties we are offering for 1956.

580. ***Ageratum tetra*** **'Blue Riband.'** The first tetraploid variety. Giant trusses of fluffy azure-blue flowers. per pkt. 1s. 6d.

567. **Aster 'Powder Puffs.'** Each plant is a bouquet in itself. Tightly double flowers in many colours. per pkt. 1s. 0d.

701. **'Bells of Ireland'** or ***Molucella laevis.*** An unusual plant with apple-green "flowers." Useful as an everlasting. per pkt. 1s. 0d.

683. **Marigold 'Man-in-the-Moon.'** Large moon-yellow flowers—the nearest yet to white. per pkt. 1s. 0d.

725. **Petunia F.1. Hybrid 'Ballerina.'** Extra large flowers of rich salmon carried on dwarf, spreading plants. per pkt. 2s. 6d.

408. ***Salvia horminum*** **'Pink Cloud.'** An early grown hardy annual carrying pink floral leaves or bracts. Lasts in bloom for many weeks. per pkt. 1s. 0d.

For full details of these and many other new and interesting flowers send today for a FREE copy of our 72-page catalogue illustrating many items in full colour.

SAMUEL DOBIE & SON LIMITED
(Dept. 21) 11 GROSVENOR ST., CHESTER

THE ALPINE GARDEN SOCIETY

Offers its members—for only £1 *per annum:*

Its renowned Quarterly Bulletins.

Seed Distribution of over 1,500 species.

Postal Library Service.

Tours and Excursions abroad.

Flower Shows in London and elsewhere.

Local Groups in various centres.

Residential Alpine Study Week-ends.

Visits to notable Rock Gardens.

Apply to:

Hon. Publicity Manager,
15 West Drive, Birmingham, 20

WALTER BLOM & SON LTD.
(of Holland)
Coombelands Nurseries,
Leavesden, Watford,
Herts.

Established 1870

BLOM for BULBS and SEEDS

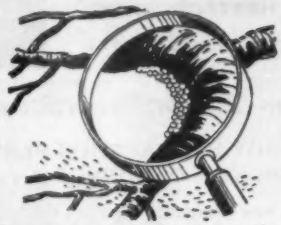
FOR QUALITY AND SERVICE

We shall be pleased to send a copy of our fully illustrated catalogue on request

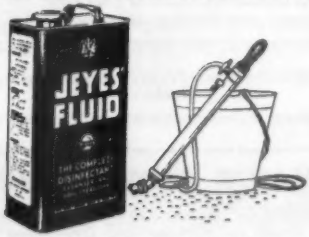
SPRAY 'EM NOW!

says Bob Green, our gardening expert

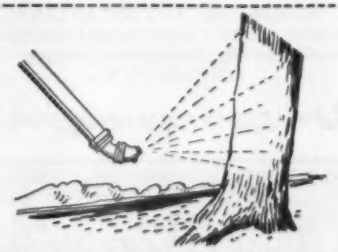
1. *Time for winter spraying, my lads—too late once the pests are into the young leaves and fruit.*



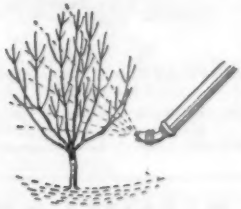
2. *Your trees are harbouring pests and eggs by the thousand—you've got 'em at your mercy now.*



3. *The best winter wash I know is one part of Jeyes' Fluid to nine parts water. Effective* **and safe, too** *!*



4. *Do spray thoroughly—plenty on the trunks too so that it runs down to the soil and roots.*



5. *Spray soft fruit too, and your roses, you don't want Black Spot on 'em. (Same strength solution).*

6. *Do your spraying this month, while trees are dormant. It'll pay you no end later on.*

FREE

Write for free copy of "Jeyes' Fluid in the Garden".

Jeyes' Fluid is sold in quart cans at 5/- and gallon cans at 15/-. From hardware stores, horticultural suppliers, chemists and grocers.

THE BEST DISINFECTANT ON EARTH

JEYES' FLUID

JEYES' (DEPT. R.H.8.4) · MILLBROOK · MANOR ROAD · CHIGWELL · ESSEX

SANDERS
FOR
ORCHIDS

WRITE FOR QUARTERLY LIST OF SPECIES FROM

SANDERS (ST. ALBANS) LTD
HERTFORDSHIRE

Tel.: ST. ALBANS 245

7/6
Per Flowering Sized Plant

FINEST SURREY
TURF LOAM
Sterilized Soils and Composts to John Innes Formula.
Particulars Free:
JOHNSTON BROS. (CRANLEIGH) LTD.
NEW PARK, CRANLEIGH

HARDY HERBACEOUS PLANTS FOR THE GARDEN. *J. B. Paton.*

A new pamphlet containing lists and descriptions of plants suitable for the border together with several specimen plans.

Illustrated. Price 1*s.* 6*d.*, post 3*d.*

Obtainable from: THE SECRETARY, THE ROYAL HORTICULTURAL SOCIETY, VINCENT SQUARE, LONDON, S.W.1

KNIGHT'S NURSERIES LTD.,
HAILSHAM,
SUSSEX. TEL. 454

NEW RASPBERRY—GOLDEN EVEREST

Very prolific, a strong grower, bearing large quantities of golden fruit of delicious flavour during July and August.

An outstanding variety of great merit.

Strong canes for immediate delivery.

42/- per doz., 250/- per 100. Carriage paid.

Send for Catalogue of Fruit and Ornamental Trees, Shrubs, etc.

UNCOMMON
plants of
DISTINCTION

Hardy Terrestrial Orchids
Rare Hardy and Coolhouse Bulbs
The Finer Lilies
my specialities

Descriptive catalogues free on request

G. B. RAWINSKY
384 WHITTON AVENUE, GREENFORD, MIDDLESEX

SMAIL'S GARDEN SHOP

Bulbs for Garden or Indoor Culture
Seeds for Garden and Greenhouse
Climbing, Alpine and Hardy Plants
Flowering and Evergreen Shrubs
Lawn Grass Seed. Fertilizers
Insecticides. Sankey's
Garden Pots
John Innes
Composts

W. SMAIL
44/46 Palmer Street, Westminster, S.W.1.
ABBey 4427
One minute from St. James's Park Station
Five minutes from R.H.S. Hall

MASKELL'S—
THE PRIZEWINNER'S CHOICE

WE supply ALL fertilisers, manures and insecticides, including "Super" Hop, the ideal manure for ALL soils and crops; economical, easy and clean to use, weed-free ("Large" Sack, 18/6 for 1,000 sq. ft.; "Double Large" 31/6); also all Horticultural aids: Naphtho Lime, Garden Limes, J.I. Composts, Peats, Bone Meal, Loams, Sands, Sulphate of Potash, Nitrate of Soda, Lawn Dressings, Tomato, Chrysanthemum and other special fertilisers, Fruit Tree and all other washes, etc., delivered any address in U.K. at competitive prices.

FREE ON REQUEST Gardener's Handbook and Price List of 80 products, Phone Maryland 2728, or

Send to **MASKELLS (1900)**
68 DIRLETON RD. WORKS LONDON E.15

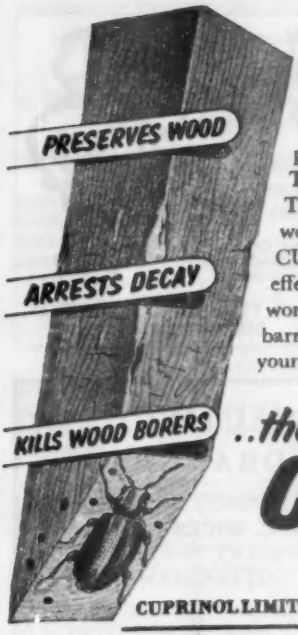
BUNYARDS

FOR FINE QUALITY
FRUIT TREES, ROSES, SHRUBS AND HARDY PLANTS

We have been specialists for over 150 years.

Send to-day for a FREE copy of our new season's catalogue listing all the best varieties at very reasonable prices.

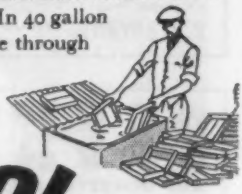
GEORGE BUNYARD & CO LTD
(Dept. 5) MAIDSTONE EST. 1796



Wherever WOOD is used..

CUPRINOL WOOD PRESERVERS give deep, lasting protection from rot, decay, mildew and wood boring insects. They lessen warping, swelling and grain-raising of wood. The green grades are recommended for horticultural woodwork and have been successfully used for over 40 years.

CUPRINOL DIP is a special Green grade, economical and effective for dipping seedboxes and other horticultural woodwork. Harmless to plants when dry. In 40 gallon barrels or 5 gallon drums. Obtainable through your usual horticultural sundriesman.



..there's a job for

CUPRINOL

WOOD PRESERVERS

CUPRINOL LIMITED, Terminal House, Grosvenor Gdns., London, S.W.1 Tel. SLOane 9276

UNWINS OF HISTON

Seeds of Quality

The secret behind glorious gardens

No matter how much time and hard work you devote to a garden, it will be largely wasted unless you can rely upon the seeds. Gardeners all over the world rely on Unwins.

Our Catalogue, beautifully illustrated in colour, contains all that is best in the flower and vegetable world, including Unwins wonderful range of Sweet Peas and Gladioli, etc. Send a postcard for your free copy right away and start planning now

W. J. UNWIN LTD. HISTON CAMBRIDGE

DRON-WAL Supreme SPRAYERS & SYRINGES

The "MASTER" PNEUMATIC SPRAYERS

For ALL your spraying needs!

Simple, Easy Action, Brass throughout. Takes all insecticides, with bend for underleaf spraying. Highly suitable for spraying hormones on Tomatoes or Seedlings in the greenhouse. See your Seedsman or Ironmonger.

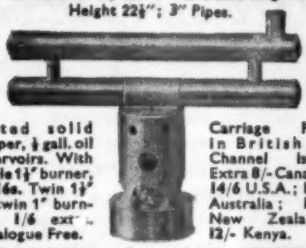
Registered Design.

Send for List (No. 5 P/T)

The PHILIP B. WALDRON CO., Kings Road, Tyseley, BIRMINGHAM·11.

COPPER HOT WATER RADIATORS

For Greenhouses, etc. Extreme length 29½" Height 22½"; 3" Pipes.



Fitted solid copper, ½ gall. oil reservoirs. With single 1½" burner; £4 16s. Twin 1½" or twin 1" burners, 1/6 extra. Catalogue Free.

Carriage Paid in British or Channel Isles. Extra 8/- Canada; 14/6 U.S.A.; 10/- Australia; 14/- New Zealand; 12/- Kenya.

P. J. BRYANT, Forest Road, Fishponds, **BRISTOL**

TRY WOOLMANS FIRST

for

Chrysanthemums, Dahlias *and* **Begonias**

Send 9d. for our famous 1,000 variety Catalogue and culture book in colour.

H. WOOLMAN LTD., DEPT. R., SHIRLEY, BIRMINGHAM

ORCHIDS

BUY INSPECTED PLANTS DIRECT from the ACTUAL PRODUCERS!

LARGE STOCKS of MODERN HYBRIDS, CYMBIDIUMS, CYPRIPEDIUMS, CATTLEYAS, etc., ODONTOGLOSSUMS, MISCELLANEOUS and BOTANICALS—all at reasonable Prices.

Our Illustrated Booklet "The Simplicity of Orchid Growing" will be sent FREE ON REQUEST.

MANSELL & HATCHER, LTD. Dept. R.H., Cragg Wood Nurseries, RAWDON, LEEDS, Yorkshire.

BEAUTIFUL HYDRANGEAS

For Greenhouse or Garden

W. C. WICKS LTD. MAPPERLEY NURSERIES NOTTINGHAM

are specialist growers and offer finest pot-grown plants in most modern varieties.

Send S.A.E. for List.

—"CRAVEN"—

WINTER WASHES AND SPRAYING OUTFITS

OF ALL TYPES

FULL DETAILS FROM:—

W. J. CRAVEN & CO. LTD

PHONE 2631-2 **EVESHAM**

Always ask for . . .

ROLCUT

Secateurs

THE **"VALE"** WANEY ELM **GARDEN SHED**

7 ft. long × 5 ft. wide.

Cash £15.10.0 or 50/-

Deposit and 12 monthly payments of 24/11

"VALE" WANEY ELM GARAGE

12 ft. long × 8 ft. wide.

Cash £29.15.0

or Easy Terms. Prompt dispatch. Send for free lists. Also for all types of Fencing.

CARRIAGE PAID home England and Wales mainland

VALE COUNTRY PRODUCTS (Dept. R), Wantage, Berks.

STEAM STERILIZER & ACCESSORIES for the Home Preparation of **SEED & POTTING** John Innes **COMPOSTS**

Approved by The John Innes Hort. Inst.

Standard Set £3.15.0 Electric Set £6.10.0

Send for brochure to:—

THE HORTAID COMPANY, Kegworth, By Derby

You are invited to send for our

1956 CATALOGUE
of PEDIGREE FLOWER AND VEGETABLE SEEDS

In one list are to be found the specialities of many World-famous Growers including:

RAOUL MARTIN'S Carnations and Zinnias
ROGGLI BROS.' Pansies
FISCHER'S Cyclamen
CHARLES MOREL'S Petunias, Fressias and Cinerarias
TEICHER'S Stocks and Asters
WEISER & VIRNICH'S Begonia, Gloxinia and Calceolaria

IMPORTERS OF THE OUTSTANDING SUCCESSES OF 1955

CHINCHERINCHEE
DOUBLE CHRYSANTHEMUM SEED, large-flowered
DWARF SWEET PEA "Little Sweetheart"
MULTIFLORA SWEET PEAS

NEW FOR 1956

ANTIRRHINUMS, double-flowering and F.1. Hybrid.
PETUNIA 100% double ***"Gaiety"***
PETUNIA F.2. Hybrid ***"Carnival"***

A copy of our Illustrated Catalogue will be sent, post free, on request.

GEORGE B. ROBERTS
(Seed Merchant)
FAVERSHAM, KENT

GREENHOUSE HEATING EQUIPMENT...

Phillips Imperial Boilers are confidently recommended for their exceptional value and economy in operation. Boilers or complete sets can be supplied. Thousands of satisfied users. Boilers are available in 5 sizes from £9.6.3. Send for complete list.

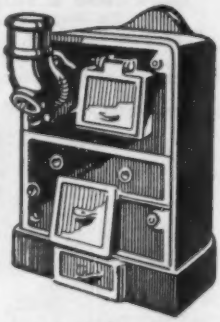
COMPLETE APPARATUS

Examples:—

Prices include boilers, smoke stack, etc., all h.w. pipes, stays, expansion joints, bolts, etc., ready to fix. Easy to follow instructions sent with every apparatus. Prices are for a house with two 4" h.w. pipes on one side of the house.

6 ft. × 6 ft. £16.10.0
8 ft. × 6 ft. £17.9.9
10 ft. × 8 ft. £18.19.6

Deferred terms available



We would recommend that you send for our catalogue which gives complete details

H. E. PHILLIPS LTD
96 King William St., Coventry

BARR'S
SEEDS

FINEST SELECTED STRAINS AND TESTED GROWTH

VEGETABLE SEEDS
SEED POTATOES
FLOWER SEEDS
GRASS SEEDS
BULBS

Catalogue post free on request

Our firm has now been amalgamated with Messrs. Wallace of Tunbridge Wells. The same proud tradition of quality and service will be maintained.

It is cheapest in the long run to BUY THE BEST FROM

WALLACE & BARR
THE OLD GARDENS, TUNBRIDGE WELLS, KENT

The easy way to success with house plants

Luxigro tablet fertiliser is the perfect tonic for all indoor plants. It promotes strong, healthy growth and combines the carefully balanced ingredients necessary to healthy plant life. Luxigro No. 1 for leaf-bearing plants, and Luxigro No. 2 for flower-bearing plants. (*It is important that the correct type of tablet be used.*)

Recommended by Rochfords, the house-plant specialists.

Luxigro A CHEMICO PRODUCT **TABLET FERTILISER**

FREE BOOKLET

Send stamped addressed envelope for your copy to:
THE COUNTY CHEMICAL CO. LTD. (Dept. H.2.), SHIRLEY, BIRMINGHAM

HARBINGERS OF SPRING

In winter add beauty and scent to your garden by planting:—

DAPHNE MEZEREUM, in pink or white, on leafless branches in winter.

LONICERA STANDISHII, bush winter honeysuckle with cream-scented flowers.

MAHONIA JAPONICA ('Berberis Bealei'), lily-of-the-valley soft-yellow scented sprays on handsome evergreen foliage.

SARCOCOCCA HUMILIS, another deliciously perfumed winter-flowering evergreen.

Burkwood & Skipwith Ltd.
The Shrub Specialists
Park Road Nurseries, Kingston, Surrey
Telephone: KIN 0296

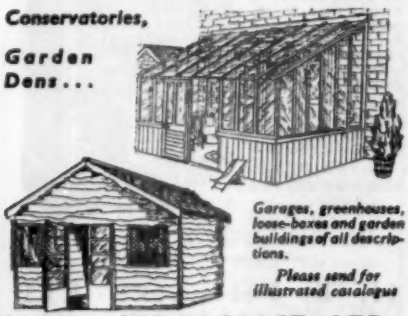
KETTERING LOAM

As supplied for over 30 years to the Leading Horticulturists. Hand-Dug Yellow Fibrous, from our own virgin fields. Also Bedfordshire Silver Sand and Noted Nottingham Marl.

Quotations for any quantity, delivered by Rail or Road Transport to your door.

KETTERING FUEL CO. LTD.
28a STATION RD., KETTERING, NORTHANTS
Telephone: 3059

Conservatories, Garden Dens...



Garages, greenhouses, loose-boxes and garden buildings of all descriptions.

Please send for illustrated catalogue

ALPHA WOODCRAFT LTD.,
Dept. 34, Gutteridge St., Hillingdon Heath, Uxbridge, Middx. *Tel. HAYes 0657*

ALLWOOD'S CARNATION FLOWERS

are the ideal gift for all occasions.

Selected colours or unique mixed shades.

From:
1 gn. to 5 gns. per box

Write for Catalogue

Allwood Bros LTD. *Carnation Specialists*

Cut Flower Dept.
HAYWARDS HEATH SUSSEX

STUART BOOTHMAN

has specialised in
ROCK GARDEN PLANTS
for over twenty years.

His illustrated catalogue gives cultural notes for each sort and guarantees to replace any that die within three months of planting.

Please ask for a copy.

NIGHTINGALE NURSERY,
MAIDENHEAD · BERKS.

"SOUTHDOWN" WOVENWOOD

Made from good quality imported seasoned wood and extra strong construction, with Oak Posts. Also Hazel and Osier Hurdles, Teak Furniture, Tennis Courts and surrounds, and *all* types of Fences and Gates. Fixed if required.

GERALD GILMER LTD.
TEL.: 1640/1 **LEWES** EST. 1922
And at BISHOP'S WALTHAM. Tel.: 271

RHODODENDRONS

We supply a special grade of Peat for Rhododendrons as well as other grades for Flower Borders, Vegetable Gardens, and John Innes Composts.

Ask for special leaflets.

THE ECLIPSE PEAT COMPANY LTD.,
ASHCOTT · Nr. Bridgwater
SOMERSET
Telephone: Meare Heath 282 (2 lines)

SWEET PEAS

You can obtain from us

STRONG SEED OF 100% GERMINATION
GROWN ON OUR OWN SEED FARM
TRUE SELECTED STOCKS
THE BEST OF THE MOST UP-TO-DATE VARIETIES

Our Sweet Pea and General Catalogue of Selected Strains of Vegetable and Flower Seeds will be posted to you by return on your request.

From—
J. R. PEARSON & SONS, LTD.
LOWDHAM, NOTTS.
Growers and distributors of the Best Seeds for 173 years

Asiatic Magnolias in Cultivation

BY

G. H. Johnstone, O.B.E., V.M.H.

With a foreword by The Hon. D. Bowes-Lyon, V.M.H.
PRESIDENT OF THE ROYAL HORTICULTURAL SOCIETY

For many years Mr. Johnstone has grown and studied those of the Asiatic members of the genus Magnolia which can be grown in English gardens. This book contains the results of his observations, both botanical and horticultural, and forms the most exhaustive study of these magnificent plants yet published. A full description of each species is given, and there are also chapters on cultivation, pruning and propagation. It contains fourteen plates in offset litho from drawings by Ann Webster, Stella Ross-Craig, Lilian Snelling and P. Ciccimara, as well as twenty pages of monochrome illustrations in collotype. The text is printed by the Chiswick Press. The size of the book is 12¼ in. by 9¼ in.

" . . . a great book." " From this book you can learn more about magnolias than anyone else is likely to tell you."
—V. SACKVILLE-WEST, *The Observer*.

" . . . an outstanding book."—*The Field*.

" . . . superbly produced." " The book is magnificently illustrated, in both colour and monochrome; the coloured plates are of great beauty, and, of themselves, make the book a collector's piece. But it is more than that. No one could have attained the results one sees at Trewithen without an intensely practical understanding of what is needed to give magnolias a fair chance in life, and all that knowledge is here lucidly laid out for the service of readers."
—*Country Life*.

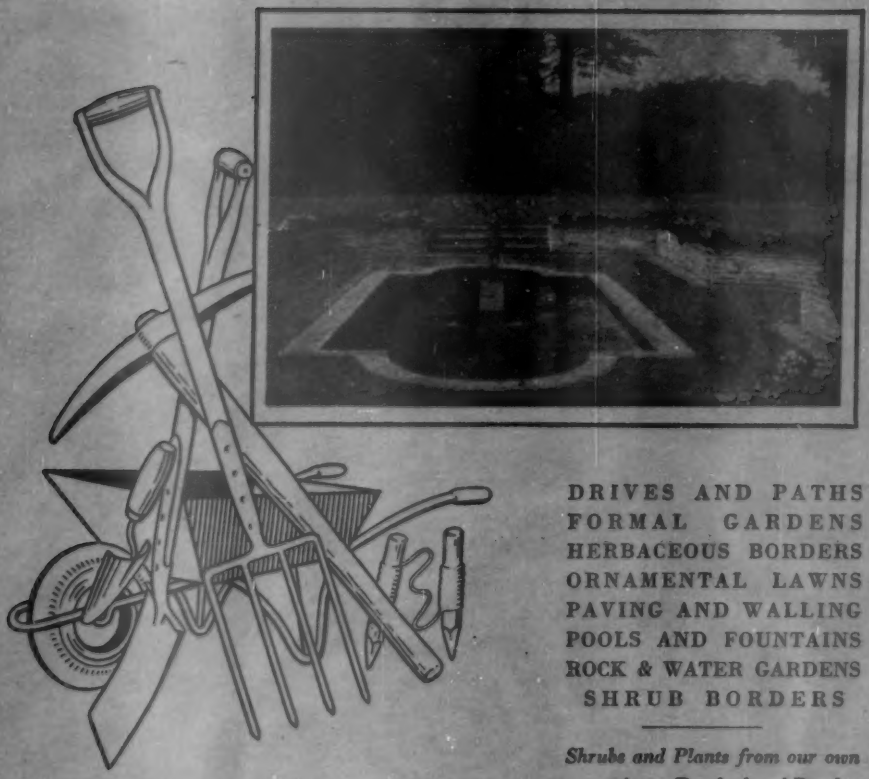
Price 3 guineas

Postage and packing: Great Britain 3s. U.S.A. $10.00 post free

Waterers

LANDSCAPE DEPARTMENT

Garden Construction of all kinds



DRIVES AND PATHS
FORMAL GARDENS
HERBACEOUS BORDERS
ORNAMENTAL LAWNS
PAVING AND WALLING
POOLS AND FOUNTAINS
ROCK & WATER GARDENS
SHRUB BORDERS

Shrubs and Plants from our own nurseries at Twyford and Bagshot

ENQUIRIES TO:—

JOHN WATERER, SONS & CRISP, LTD.
LANDSCAPE CONTRACTORS
THE FLORAL MILE · TWYFORD · BERKS
TELEPHONE—WARGRAVE 224 (3 lines)

Printed by Spottiswoode, Ballantyne & Co. Ltd., London and Colchester.